DOCUMENT RESUME

ED 429 438 FL 025 708

AUTHOR Breton, Albert, Ed.
TITLE Economic Approaches to Language and Bilingualism. New Canadian Perspectives.
INSTITUTION Canadian Heritage, Ottawa (Ontario).
ISBN ISBN-0-662-26885-7
ISSN ISSN-1203-8903
PUB DATE 1998-00-00
NOTE 261p.
AVAILABLE FROM Official Languages Support Programs, Department of Canadian Heritage, 15 Eddy, Ottawa, Ontario, Canada K1A-OM5 (Cat. no. CH3-2-7/1998E); Tel: 819-994-2224; Web site: http://www.pch.gc.ca/offlangoff/perspectives/index.htm (free).
PUB TYPE Books (010) -- Collected Works - General (020)
EDRS PRICE MF01/PC11 Plus Postage.
DESCRIPTORS Bilingual Education; *Bilingualism; *Economic Factors; Economics; Foreign Countries; Global Approach; Human Capital; International Trade; *Labor Economics; Language Minorities; *Language Role; *Languages; *Official Languages; Regional Characteristics; Second Language Instruction
IDENTIFIERS Acadians; *Canada; New Brunswick

ABSTRACT

Six essays on the links between official languages and the economy in Canada include: "An Economic Analysis of Language" (Albert Breton); "The Economics of Language in a Virtually Integrated Global Economy" (Richard G. Harris); "Speak and Ye Shall Receive: Language Knowledge as Human Capital" (Krishna Pendakur, Ravi Pendakur); "Bilingualism and Earnings: A Study Based on 1971, 1981, and 1991 Census Data" (Louis N. Christofides, Robert Swidinsky); "Bilingualism in Employee Recruitment and the Role of Symbolic Analysts in Leading Export-Oriented Firms" (Harold Chorney); and "The Contributions of a Minority to its Region: The Case of the Acadians in New Brunswick's South East" (Maurice Beaudin). (MSE)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

Canadian Heritage
Patrimoine canadien

ED 429 438

NEW CANADIAN PERSPECTIVES

Economic Approaches to Language and Bilingualism

Edited by Albert Breton

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
Michael O'Keefe
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☒ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

FL 025 708

Canada

BEST COPY AVAILABLE

Canadian Heritage
Patrimoine Canadien

NEW CANADIAN PERSPECTIVES

Economic Approaches to Language and to Bilingualism

Edited by Albert Breton
Department of Economics
University of Toronto

OFFICIAL LANGUAGES

Canada

The opinions expressed in this publication are those of the authors and do not necessarily reflect federal government policy or opinion.

Canadian Cataloguing in Publication Data (Canada)

Economic Approaches to Language and Bilingualism

(New Canadian Perspectives, ISSN 1203-8903)
Text in English and in French (two volumes).
Includes bibliographical references.
ISBN 0-662-26885-7
Cat. No. CH3-2-7/1998E

1. Language policy — Economic aspects — Canada.
2. Bilingualism — Economic aspects — Canada — Congresses.
I. Canada. Canadian Heritage.
II. Series.

P119.32C3 1998 306.44971 C98-980242-6.

© Department of Public Works and Government Services Canada, 1998

TABLE OF CONTENTS

Introduction i
Albert Breton

1. An Economic Analysis of Language 1
Albert Breton

2. The Economics of Language in a Virtually Integrated Global Economy 35
Richard G. Harris

3. Speak and Ye Shall Receive: Language Knowledge as Human Capital 89
Krishna Pendakur and Ravi Pendakur

4. Bilingualism and Earnings: A Study Based on 1971, 1981 and 1991 Census Data 121
Louis N. Christofides and Robert Swidinsky

5. Bilingualism in Employee Recruitment and the Role of Symbolic Analysts in Leading Export-Oriented Firms 185
Harold Chorney

6. The Contribution of a Minority to its Region: The Case of the Acadians in New Brunswick's South East 223
Maurice Beaudin

INTRODUCTION

In May 1995, the Department of Canadian Heritage invited a group of people from academia, business, and other backgrounds to informally discuss the different relationships that could be presumed to exist between Canada's official languages and the economy. The meeting, which took place in Ottawa and for which all participants had prepared a short paper, was a success. It did make clear, however, that to better understand the links between official languages and the economy, something more was needed. The Department decided that a modest research program would be a useful first step. A departmental committee[1] was created to define guidelines and to attract researchers that would accept to undertake the work. I was invited to join the committee and to act as coordinator of the research program. The papers included in this volume are the first fruits of that program.

What we may call the economic approach to language is not, as yet, constituted of many well-defined propositions. Scholars and others who choose to reflect on language problems by making use of concepts and methods borrowed from economics have no more than a few papers, their imagination, and their sense of reality to guide them. There are, to be sure, some basic arguments that appear to have gained acceptance and that provide guidance to new research, but there are remarkably few of these. Discussing with economists who possibly could have been interested in participating in the Department of Canadian Heritage's research program, I was more than once surprised to discover that these colleagues, all of whom knew about the application of economics to issues that have not been traditionally considered to fall in the domain of economics, did not know about the work on the economics of language that had been done over the last 30 years or so. If an economics of health, of family, or of culture exist, there is still no field of language economics.

---

[1] The departmental committee is made-up of: Albert Breton, Pierre Gaudet, Ned Ellis, Ghislain Savoie, Michael O'Keefe, Paule Doucet.

One has to expect that over the next 10 years or possibly even longer, work on languages and their relationship to economies will continue to lack unity. That may not be a serious problem if a core of basic propositions come to be accepted as useful and productive. A synthesis is always appreciated especially if it permits a simplification of concepts and a demonstration that propositions which had appeared to be at variance with each other are indeed complementary. But the very purpose of research—the purpose of that activity whose object is an expansion of knowledge—is to undermine the last best synthesis. Let me illustrate. There is evidence, but of a still very impressionistic sort, that languages have an influence on the pattern of tourism. If the benefits of tourism exceed its costs, a corroboration of the current impressionistic evidence would lead us to reconsider our ideas on the social, as distinguished from the private, yield on investments in languages and in bilingualism. That would force us to re-think not only the theory of investment in languages as human capital, but also to reappraise public policies regarding the teaching and learning of languages.

Although the matter is discussed in my own contribution to the present volume, I want to emphasize that the application of economic concepts and economic methodology to the analysis of language has many potential advantages. More than the other social sciences, economics possesses rules and criteria which at times may seem pedantic and superfluous, but which serve as guides to insure completeness—to insure, for example, that the assumptions which underlie hypotheses are spelled out and analysed. That being said, it should also be clear that in many areas, of which language is certainly one, there are problems and issues which economics cannot illuminate.

All the papers contained in this volume examine some aspect of the relationship of languages to the economy. My chapter extends the work I did with Peter Mieszkowski in the 1970's, work that treated the learning of languages as an accumulation of human capital governed by the net yield on that asset. Richard Harris from Simon Fraser University examines in some detail the impact of recent innovations in information and communication technologies on language use. This theoretical analysis greatly extends our understanding of the relationship of language to the economy. Two systematic and up-to-date econometric studies—one by Krishna Pendakur of Simon Fraser University and Ravi Pendakur of the Department of Canadian Heritage and a second one by Louis Christofides and Robert Swidinski of the University of Guelph—offer measures of the yield to languages in Canada in different contexts and for different populations.

The volume also contains two empirical, though not econometric, studies of the value of languages in two specific contexts. One by Harold Chorney of Concordia University examines how knowledge of languages can be a source of employment; and a second by Maurice Beaudin of the Université de Moncton suggests that knowledge of language can be a source of economic growth. Though they are less rigorous than the econometric studies, these two pieces of research help us further appreciate how knowledge of languages affects economies.

The topics addressed in these six chapters are only a small sample of possible topics related to the interconnections between languages—especially Canada's official languages—and the economy. It is hoped that further work can be made available to the public in future years. It is also hoped that these studies will provoke scholars to undertake systematic studies in the economic aspects of language and bilingualism.

Albert Breton
Department of Economics
University of Toronto

1. AN ECONOMIC ANALYSIS OF LANGUAGE

Albert Breton[1]
Department of Economics
University of Toronto

1. THE ECONOMICS OF "NON-ECONOMIC" REALITIES

Modern microeconomics is both a set of models and theorems that can may be used in understanding a particular empirical reality or in drawing a conclusion about its development; a set of methodological propositions that may be invoked in analyzing specific problems; and a specific technical language with terms that have, on the whole, well-defined meanings. Historically, microeconomics was developed to study the pattern and volumes of trade in goods and services between individuals and firms located in the same or different areas, as well as the conditions in which these transactions will be conducted, usually by the means of a currency. It is only in recent decades that economists and others have become aware that tools that had been developed to analyse trade in goods and services could be used to study political and social questions such as political behaviour and governmental organization (bureaucracy), gender and racial discrimination, addiction, nationalism and language. Those are only a few of the areas in which microeconomic theorems, methods and language have helped to achieve new and interesting results.

---

[1] This paper was written in the Fall of 1996 while I was a Fellow at the International Centre for Economic Research in Turin, Italy. I would like to thank the Centre and in particular the Director, Enrico Colombatto, and his Executive Assistant, Alessandra Calosso, for making his stay at the Centre productive and enjoyable. I would also like to thank Giorgio Brosio, Enrico Colombatto, Silvana Dalmazzone, Tomasz Dolegowski, Ned Ellis, Pierre Gaudet, Michael O'Keefe and Ghislain Savoie for discussing the subject matter with me and for commenting on the paper itself. I am solely responsible for any remaining errors.

When moving from a focus on "economic" phenomena to one on phenomena hitherto taken to be "non-economic" in nature, any aspect of the discipline of economics can be brought to bear, but it is not possible to claim that an analysis of a political or of a social question is truly economic unless the basic methodology of the discipline is adhered to. One of the essential tenets of that methodology is that one should first analyse how individuals and organizations adjust to changes in the environment which is postulated to be theirs. In standard theory, this leads to the analysis of the demand for a good or a service by households and of the supply of the same good or service by firms. That analysis tells us how households and firms react to changes in the price of the good or service under scrutiny, in the prices of products and services that are substitutes or complements to that good or service, in the prices of factors of production used to produce the good or service, in incomes, preferences, and technologies. This first step is an essential component of economic methodology, but it would be of limited significance if a second step was not taken, one which leads to the analysis of markets—and, eventually, to the analysis of the economic system as a whole. This second step is often hard to take, especially in new areas of analysis, because of the large number of interacting variables involved. Still it is essential to be aware that the second step is a fundamental one, indeed the truly economic hallmark of the methodology of modern microeconomic analysis.

In what follows the two steps will be taken. The reader will have no difficulty observing that, in matters related to the analysis of language, more is known about issues related to the first step than about those pertaining to the second. Still, there is at present in economics a large volume of work which is not only of great interest in itself, but which appears capable of shedding light on issues pertaining to the second step, issues related to the diffusion, survival and other systemic states of languages in unilingual, bilingual and plurilingual societies. We will make use of some of these developments in what follows.

2. LANGUAGES AS HUMAN CAPITAL

Physical or non-human capital is the *stock* of machines, roads, bridges, buildings, and so on which are a contributing source to today's and tomorrow's *flows* of output and income. The flows, on a per-period basis, measure the yield or return on the capital. Investments are increments in the stock of capital. Investments are possible if the flow of consumption is less than the flow of income produced in a given period. Because of this, non-human capital is at once the sum of past and current investments in machines, roads, bridges, buildings, et cetera and the accumulated stock of produced means of production. In like fashion, human capital is the *stock* of skills, physical and mental health, knowledge, and so on which are a contributing source to a person's earning power today and tomorrow. Growth in the stock of human capital is also the result of investments of resources in that form of capital. And as with physical capital, growth in human capital is possible if current consumption is less than current actual and potential income. Like with physical capital, human capital is the accumulated stock of produced means of production. For example, the health parents transmit to their children is, for the children, inherited human capital. The children can possibly better that health —accumulate more of that form of human capital by allocating resources (better diets[2], preventive care—immunizations, mammograms, colonoscopies, exercise, etc.) to that end. When that happens the accumulated stock of produced human means of production increases.

The point is important enough to deserve a re-statement. Unless resources—goods and services, time, mental and physical energy, and so on—are withdrawn from the flow of current consumption, including the current consumption of leisure, and allocated to improvements in skills, health, knowledge, and other kinds of human capital, there is no investment in that form of capital. Among the components of knowledge and therefore of human capital are languages: first languages, sometimes called mother tongues, and all other languages. From the point of view of human capital theory, learning one or more languages is the investment of resources—tuition fees, dictionaries, grammars, cassettes, books and, of central importance, time not allocated to other valuable activities (including leisure)—in a particular form of human capital. The language one learns on the street while "hanging-out" with one's friends is "inherited" human capital, at least if the learning of the language is an inevitable by-product of the hanging-out. It resembles the health one inherits from one's parents. Subsequent improvements in the inherited language will generally be investments in human capital.

---

[2] More healthy diets may be less expensive than diets that are "unhealthy", in which case physical (monetary) resources are economised. However, the changeover from one sort of diet to the other may be costly in psychic (non-monetary) resources. Reduced to comparable present value dimensions a "better" diet may or may not save resources.

Before examining what determines the yield on languages as well as some of the other factors that help determine why people invest (or do not invest) in languages, it is important to stress a point which is sometimes given short shrift in discussions of human capital. Ownership of a physical asset (a house or a car, for example) or of a title to a physical asset (a share of stock) usually confers a right to sell or otherwise dispose of the asset. That property or ownership right confers a value to the asset which it would not otherwise have. Ownership of a human capital asset does not usually confer the right to sell the asset. (References to slavery and indentured contracts in which human capital is effectively sold are misleading because neither of these transactions in human capital are respectful of the fundamental liberty of exchange and contract essential to a meaningful attribution of value to ownership). Ownership of human capital confers the right to, as it were, "rent" the assets—that is, to make them available to another person, to a firm, and/or a government for a price per time period. Other things being equal, this means that, in equilibrium, the marginal yield on the equivalent of a dollar invested in human capital will be lower than the marginal yield on a dollar placed in physical capital.

3. THE YIELD ON LANGUAGES

In this section we focus on a typical individual who is assumed to be rational in the sense that she makes decisions which, from her point of view, are deemed to be the best possible. Nothing more is meant by the assumption of rationality. The words "from her point of view" are not innocuous. They mean that decisions are made by considering only factors that affect the person's own well-being. It is common in economics to distinguish between, say, benefits that are private and those that are social. Often the two are equal, in which case the distinction is redundant. When, however, the social exceed the private benefits, the distinction is essential.[3] In the case of investments in languages, as we will discover, the social yield may exceed the private yield and, as a consequence, it will be necessary to distinguish between what is private and what is social. The words "from her point of view" then mean that in making decisions, only private factors are taken into account. We also assume that the individual is well-informed about the magnitudes that govern her choices. This is a more restrictive assumption than the one about rationality. For that reason, we look at some of the consequences of the fact that individuals are often not well-informed. We finally assume that our typical individual does not face a budget constraint that prevents her from investing in profitable alternatives. We assume, in other words, that loans are always available at interest rates that reflect the scarcity value of loanable funds and nothing else. Because such constraints are in fact prevalent, especially for investments in human capital assets whose ownership, as we have just seen, does not confer the right to sell them or to use them as collateral in the loanable funds market, we look at some of the consequences of the fact that the market for loans is "imperfect".

Given these assumptions, individual decisions regarding investments in non-human and in human capital and therefore in languages are governed, among other things, by the net yield or net rate of return on these investments. Consequently, we begin by looking at some of the factors that help determine the net yield (gross yield minus investment costs) on languages. We also consider how a typical individual makes decisions about the amount of non-human and human capital to accumulate and, in particular, about how much she will learn by way of languages.

The discussion is organized as follows. First, we look at the yield on mother tongues or first languages. The mother is often seen as the main agent in the "primary socialization" of a child, with the family also making a contribution, hence the notion of mother tongues. The language acquired in that process of socialization should not be conceived as an investment in human capital—it is more like inherited human capital. But as Batley et al (1993) remark: "the language acquired by the child [in the family] usually does not follow the norms established for the public use of language." As a consequence, when going to school, "the child must not only learn a variety of language which differs from the one used in the home, but must also acquire its written form" (p. 10). This problem is particularly severe when what is learnt at home is a "dialect". Additions to mother tongues and modifications of dialects are genuine investments in human capital. A look at this form of investment will help us clarify a number of important dimensions of what constitutes the yield on languages; moreover, virtually all we will say about mother tongues carries over to other languages.

---

[3] Because private benefits are a component of social benefits the second can exceed, but never be less than, the first. The same reasoning applies to costs.

After this look at investment in first languages, we turn our attention to the learning of second, third, or fourth languages.[4] These, however, are acquired for more singular reasons. We begin our analysis by looking at the factors that determine the net yield on second languages when these languages are acquired for the purpose of trading in goods, services, and factors of production. We then make use of the trade model to illuminate the question of who bears the cost of learning second languages when these languages are acquired to trade. We then—in subsection d—mention some cultural consumption benefits that accrue to first and second languages. Finally, we examine how investment decisions are made.

3a. The Yield on Mother Tongues

Following the initial mother-child and family socialization in a language, an individual[5] may decide to invest resources to improve the quality of the mother tongue or first language which she has inherited from socialization. In other words, the individual may decide that in addition to speaking (and possibly reading) the language, she would like to write it. Furthermore, the quality of the speaking and of the reading can be improved. There are, therefore, three margins or directions along which resources can be invested: speaking, reading, and writing the first language.

---

[4] To simplify the presentation, in the remainder of the paper I refer to second languages only. Nothing is lost by restricting the presentation in this way.

[5] In the early stages of life, at the very least, decisions are made by a parent, a guardian, or a trustee acting for the child. To simplify the presentation, I proceed as if the child herself was making decisions.

Movement on all these margins will require better knowledge of vocabulary, grammar, syntax, etc. Improvements in the quality of the language along one margin may however require more resources than improvements along another. Three questions have to be answered in connection with the underlying decisions concerning improvements in the quality of first languages: 1) what are the resources which an individual invests when she decides to move along one margin or the other?; 2) what forms will the yield on these investments take?; and 3) how far will a rational and well-informed individual, who is not constrained by "imperfections" in the market for loans, move along each of the three margins?

The resources which an individual invests to improve the quality of her speaking, reading and/or writing include quite obviously the money—or, more precisely, the goods and services which she could have purchased with the money, but did not—as well as the effort allocated to that endeavour. In many instances, however, the greater part of the investment will take the form of time, namely the time *not* allotted to earning money or to leisure, but allocated to improving the quality of the mother tongue. To appreciate the importance of this component, consider the case of a person who has already obtained a high-school diploma and is now considering a further investment in education to obtain a college degree. If the high-school diploma made it possible for that person to earn, let us say, $35,000 a year, then the amount which she forgoes over a period of (say) four years to obtain the college degree must be added, properly discounted, to the tuition fees, books, and the other expenditures necessary for the acquisition of the college degree. It is generally the case for first languages that improvements in the quality of speaking, reading, and writing are acquired together with knowledge of literature, history, science and even mathematics. That fact may complicate the measurement of the cost of the investment since the cost of improving the mother tongue is only a fraction of the total cost of the education acquired, but it does not, in any way, affect the general principle.

Many factors have an import on the costs of acquiring an education and therefore on the costs of improving a first language, but regretfully not very much is known about the relative empirical weight of each of them. A few factors can be noted. First (in no particular order of importance) is the ability of the student. The greater the ability to convert inputs (lectures, readings, auditions, etc.) into quality improvements, the lower the unit costs of these improvements. Another way of stating that proposition is to say that the higher the ability of the student, the greater is her productivity in transforming inputs into outputs. A second factor that has an impact on investment costs is the influence of the family and especially of teachers and schools. Improperly or weakly motivated parents and teachers and/or incompetent teachers raise the costs of investment in the improvement of first languages and therefore in the volume of resources allocated to that end. They do this in at least two ways. First, by adversely affecting the motivation of the children themselves, a fact which in turn adversely affects the ability or productivity of the children at converting inputs into outputs. Second, incompetent parents but, especially, incompetent teachers make it difficult, often impossible, for children to know that valuable quality improvements in their mother tongue are achievable, a lack of knowledge that is strictly equivalent to a high, possibly infinite, cost of investment.

Another factor—the last mentioned here—which raises the costs of investments designed to improve mother tongues may be called linguistic intolerance. It is a factor that is likely to be particularly important for linguistic minorities. If a language comes to be socially defined as "inferior", the costs of quality improvements in that language will be higher. Why? Simply because a status of inferiority acts as a deterrent or as a barrier to investments in quality improvements. Accents, defined as distinct or particularistic pronunciations, are often the loci of predilection of linguistic intolerance. Quality improvements in first languages will sometimes entail the modification of an accent, but they will more often take place "within" an accent. If that accent, especially if it is that of a linguistic minority group, is the locus of intolerance, that intolerance may act as a deterrent to quality improvements.

The gross yield on high quality first languages may include social status and, if it does, that component of the yield may be a powerful force leading to further improvements in language quality along the three margins identified earlier. On the other hand, if social status derives from the use of a "dialect" that status will not lead to improvements in quality. Secondly, the gross yield on first languages may include a cultural component which allows the individual, after a certain volume of investment, to enjoy literature, the arts, and a rich social interaction with other "cultivated" members of her society, and of other societies as well. Finally, the gross yield on first languages may also include income. Little if anything is known about this aspect of the question, but it is hard to dismiss the view that it must be of some importance. All sorts of occupations in entertainment, communication, and advertising, to name but a few of the occupations where linguistic excellence is valued, point to the existence of an income yield to quality speaking, reading, and writing of one's mother tongue.

On the assumption that the individual is rational, well-informed and making decisions in a context in which profitable loans are available, she will push investment along the three margins of speaking, reading, and writing up to the point where the marginal net yield on the last dollar of investment is equal at the three margins. Because the net yield can be made up of status, cultural, and income components, the equalization of marginal net yields on the last invested dollar does not necessarily mean that an individual will speak, read, and write her first language with the same proficiency.[6] Suppose, indeed, that status attaches only to the speaking component of languages and also that there is no complementarity between speaking, reading, and writing a language. Then one would expect the equality of net marginal yields at the three margins to obtain only when the volume of resources invested in improving the quality of speech is larger than that invested in improving the quality of reading and writing.

To be sure, the three components of language are likely to be complementary to a degree and as a consequence equalization of marginal net yields at the three margins will in all probability entail matching (not necessarily equal) investments at the three margins. To put it simply, we are not often likely to meet people who speak their mother tongue well, but have difficulty in reading and writing it. To the extent that one meets people who display disparities in the proficiency of speaking, reading, and writing, the cost-yield calculus associated with the economic analysis of language can help us understand why this happens.

---

[6] Complementarity here is a characteristic of the domain of investment opportunities and implies that investment along one margin must necessarily be accompanied by investments along other margins.

17

We must now recognize that many, possibly all, individuals are not well-informed about the cost and the yield of investing in mother tongues and about such characteristics as the degree of complementarity of the different dimensions of languages. The lack of information is not in respect of the economic language used here to analyse the underlying reality, but in respect of the reality itself. For example, young students do not usually and often, indeed, cannot know if the school they are attending and the teachers they have been assigned are poor or good. They may have difficulty in learning how to read and write and blame it on themselves while the true culprit is the school or the teachers.

These problems have generally been recognized and have led to the creation of public departments of education, one of whose essential roles is to address the information problem by insuring that the costs of investing in one's mother tongue will be as low as possible and insuring that students appreciate the true returns to learning a first language well. It must be recognized, however, that this task has often not been satisfactorily fulfilled. There are many explanations for the poor performance of departments of education among which are the problems that sometimes plague large bureaucratic organizations—informational deficiencies, coordination difficulties, aloofness, and others like them—as well as the "democratic" necessity of operating schools that do not create too large a linguistic gap between the children and their parents. However that may be, a thorough analysis of the main structural method that has historically been used to address the problem posed by the fact that young students in particular are poorly informed about the benefits and the costs of improving the quality of their mother tongue is urgently needed.

It is a fact also that students, at least in the years of schooling that precede university education, very often do not have access to loanable funds. That problem also has been recognized and has led governments, virtually everywhere, to provide schooling free of charge. The analysis of the preceding pages should have made clear, however, that free schooling addresses only one aspect of the costs of investment in quality improvement in first languages. It does not deal with the time and effort components of costs, components which cannot in practice be subsidized. Free schooling, in addition, does not guarantee motivated and competent teachers, possibly the opposite. This aspect of the question, like that related to the structural method of dealing with the information problem, is in great need of study.

It is not necessary to stress that all of the above analysis is applicable, almost word for word, to the learning of second languages. We note two factors that apply to second languages only. First, the unit cost of learning a second language will, in general, be lower if that second language is of the same linguistic family as the mother tongue of the person who is investing in the second language. In other words, *ceteris paribus*, it is less costly per unit of investment for an Italian to learn Spanish or French than to learn Finnish or Hungarian.[7] Investments within linguistic families benefit from economies of scale.

Second, it is interesting to note that the yield on second languages *appreciates* with use, unlike what happens to the yield on physical capital when it is utilized.[8] To rationalize this phenomenon we can assume that the marginal resource cost of investing in a second language is *reduced*, in a second period, by the positive effect of the human capital (the second language) that has been accumulated in the first period. In other words, the positive effect on subsequent capital formation is like an investment return from the production of some amount of language capital at time t (say) that reduces the investment costs at $t + 1$.[9]

If this rationalization is accepted and if resources are allocated as public subsidies to the promotion of second languages, the cost per unit of value will be smaller if *ceteris paribus* the resources are invested in younger people. The *ceteris paribus* is necessary to take into account the fact that the productivity of invested resources also depends on the "skills" of people at converting education and material into the desired capital good. It would also mean that to be truly efficient, subsidies allocated to investment in second languages should be conditional on a "sustained" use of the second languages. Otherwise the subsidies would be wasted.

---

[7] The *ceteris paribus* includes the other factors we have listed as governing costs.

[8] If we let y be the total net yield on a second language, r the rate of return proper, δ the rate of depreciation and if e denotes employment or use, we have $y = r + \delta(e)$ with $\partial y/\partial e = \partial y/\partial \delta \; \partial \delta/\partial e > 0$. (The opposite of what is generally the case with physical assets such as machines). Though I know of no evidence on the rate at which this partial derivative changes, stability requires that $\partial^2 y/\partial e^2 < 0$.

[9] Somewhat like the effect of consumption in George Stigler and Gary Becker's (1977) analysis of "addiction".

3b. A Trade Model[10]

We now move more systematically to the analysis of learning second languages. We do so, in the first instance, by looking at a trade model, a model erected on the assumption that second languages are learnt to trade in goods and services and in factors of production. To make things simple, we begin by considering a world made up of two countries that have roughly the same populations and the same national incomes, each specializing in the production of one commodity and each confined to the use of one language—each, in other words, unilingual. Modifying slightly the example used by David Ricardo, the father of trade theory, we call the two countries France and England and assume that France specializes in the production of wine and England in the production of cloth. If some English want to buy wine, they can offer cloth to the French in exchange for it; if the latter want to buy cloth, there is a presumption that a deal can be struck and an exchange consummated. We note, however, that since the two countries are assumed to be spatially and linguistically distinct, the price at which wine exchanges for cloth must be such as to cover not only the cost of producing the two goods, but also the cost of transporting them from one country to the other and the cost of communicating between wine and cloth merchants. In other words, the price of wine in England and of cloth in France will exceed the price of wine in France and of cloth in England by the cost of transportation plus the cost of communication (the only two transaction costs considered here).

If the terms of trade—that is, the price of cloth in terms of wine—are such that the goods can be produced for export in each of the two countries but the cost of transportation or the cost of communication cannot be covered, trade will not take place. Language differences therefore are like distance or any other barrier to trade that require the expenditure of resources if they are to be overcome. Another way of stating this point is to note that if resources invested in transportation equipment and in learning a second language do not yield a high enough return in the exchange of wine for cloth between English and French traders, exchange will not take place, and, therefore, in the simple case we are now considering, transportation equipment will not be built and a second language will not be learnt.

---

[10] The arguments advanced in this subsection and in the next have been greatly inspired by Breton and Miezskowski (1977).

There is nothing in the nature of this two-equal-size-country situation that allows us to predict whether it will be exporters or importers of wine who will invest in the second language. Indeed, all that can be said is that some French traders may learn English so as to be able to communicate with English wine wholesalers or retailers, or that English wholesalers or wine merchants will invest in French to buy directly from French wine producers.

This view of language as an input in the exchange process makes it possible to derive a number of propositions which could be used to "test" the worth of the approach. The first and most obvious of these propositions is that the yield on investing in the learning of a second language will be higher, and the resources invested in that asset will be larger, as the supply and demand conditions determining the comparative advantage of the two countries make trade more profitable. Along similar lines, one would predict that the higher the cost of overcoming spatial and other similar barriers to trade, the lower will be the yield on resources invested in overcoming communication barriers. This last argument can be extended to cover artificial barriers, such as tariffs, quotas, and exchange controls: the higher these barriers, the less trade and, consequently, the lower the gains from overcoming other barriers to trade, such as distance and language differences.

In order to be able to derive further propositions from the model, it is helpful to focus on some of the similarities between language differences and distance and on the means that are developed to overcome them. Methods of transportation have to be adjusted to the nature and the properties of the goods that move in trade: some goods are bulky, some are fragile and breakable; some are solid, others liquid; some are flammable, some not; and so on. For each of these different types of goods, different methods of transportation have to be developed, requiring different volumes of resources. Similarly, the language component of goods and services varies in that language proficiency demanded of traders will vary according to the language requirements of the good or service being transacted. In the case of wine and cloth which we use as examples above, the level of language proficiency required may be quite low, while for other more "sophisticated" commodities, such as bonds, capital equipment, insurance, or computer software, the level of proficiency in the second language might have to be substantially higher.

The trade model just outlined is capable of extension to a wide class of cases. First, it can be applied to multi or plurilingual societies to derive interesting propositions about these societies. Because language differences are barriers that can be overcome only by using scarce resources, one would expect people of the same language to exchange more as well as to work more with each other than with people who are of a different language, since that will economize on scarce resources. For example, one expects that in Canada, all else being equal, Francophones will trade more and work more with other Francophones than with Anglophones; similarly, that in Belgium the Walloons will trade more and work more often with other Walloons than with the Flemish; and so for the French-speaking, German-speaking, Italian-speaking, and the Romansch-speaking citizens of Switzerland.

The same trade model can take us still further. The desire to trade with individuals of a different language group, the proclivity to learn about people of a different language background and to know about events that are taking place in a different language context, and the eagerness to broaden one's experience beyond the confines of one's own language group *may* lead to the appearance of interpreters (offering simultaneous translation) and of translators—essentially language brokers.[11] These specialized individuals will allow persons who know only one language to "communicate" with other individuals who also know only one, but different, language. These specialists, because they can mediate "communication" among a large number of unilingual individuals of different languages, will permit more communication to take place per unit of resources than if the same volume of resources had been used to increase the number of bilingual people. Their presence serves to lower the yield on second languages and, as such, leads to a smaller number of bilingual persons in any given context.

---

[11] Interpreters and translators reduce the flow of resources invested in the learning of second languages among people who want to communicate with each other, but the institution that leads to the largest saving of resources is a *lingua franca*. We discuss this institution below.

Interpreters are engaged in two-way, generally verbal communication, while translators are engaged in one-way, usually written, communication. Whether interpreters and translators will appear or whether bilingualism will spread will depend on the character of supply and demand that determine comparative advantage in trade and also on the possibility of standardization and of mass marketing of the messages that have to be communicated, given that all of these factors help set the yield on second languages. The trade model adumbrated above applies *mutatis mutandis* to a world in which the "objects" traded are not goods, services, and factors of production, but ideas, information, news, and other more or less similar messages.

The argument of this subsection has been developed by looking at the case of two unilingual countries, England and France, whose economic well-being would be improved if they could take advantage of potential gains from trade. The argument is simply that it would often be profitable—that there would often be a large enough yield—for some English or French merchants to invest in language as a necessary input in the process of trade and the exploitation of the gains from trade. Suppose, however, that a certain number of French persons (say) learn the English language for reasons that are not related to trade, as would happen if English was learnt to read English literature, to attend English theater and cinema, and/or to visit England. In these circumstances, and assuming that the same people who have learnt the second language for non-economic reasons also engage in trade, the yield on that asset in the international exchange of wine for cloth would be zero in the specific sense that the prices of both cloth and wine would be lower than if some individuals had to invest in a second language for trade reasons.

It is important to note that even though only French residents learn English in the example of the last paragraph, the English do not get a free ride since the price of both commodities is lower than it would be otherwise. The situation is similar to the one that would obtain if a technological innovation had reduced the cost of transportation.

Before moving on, we should note that all of the factors which have an influence on the cost of investing in first languages will affect, *mutatis mutandis*, investments in second languages. This is obvious for the productivity of investors and for the quality of schools and the competence of teachers. We wish to stress that this is particularly true for intolerance and discrimination. Some of the early applications of economic theory to language built on a presumed necessary connection between language and ethnicity and used economic models of discrimination to explain why certain ethnic groups earned lower incomes than others (see Migué, 1970 and 1979; Raynauld and Marion, 1972). It is not necessary—indeed, not generally consistent with the facts—to identify ethnicity and language. Linguistic intolerance and discrimination will increase the cost of investing in a second language and may lead to lower incomes whatever the ethnic background of the investor. Indeed, a strong implication of the early line of analysis is that, because discrimination reduces and at the limit extinguishes the yield on the second language, investment in that language is a waste. For example, if Quebec anglophones discriminate against francophones on the basis of ethnicity, as the early literature assumed, the learning of English by these francophones to better their economic situation would be a waste of resources. That same conclusion can, however, be reached without identifying language with ethnicity.

The existence of intolerance and discrimination at a moment in history raises an interesting question. Suppose that in a first period (t1) there is discrimination [whether preference based as in Gary Becker's (1957) analysis, or "statistical" as in Kenneth Arrow's model

(1972, 1973)][12] by a group we will call E against members of another group F, and that this discrimination leads to *ceteris paribus* disparities in pecuniary incomes of the magnitude that the early research identified. If t1 is a long enough period, it will lead members of the F group to rationally curtail investment in a second language and to become more unilingual, except if the cultural rate of return is sufficiently high. Now, assume that in a second period (t2) the discrimination ruling in t1, for reasons that we need not elucidate, simply vanishes. The passing away of the discrimination reduces the costs of accumulating capital in the second language for the purpose of benefitting from a pecuniary yield. The question that must be answered is: how do the Fs learn that discrimination no longer exists, and how do they learn that investing in the second language can now raise their money income?

To be able to answer these questions, one must know something about the structure of beliefs in respect of discrimination among the Fs and one must invent policies to diffuse the relevant information. In the absence of data, one should assume the long-term persistence of undisturbed belief structures. Historically, the preferred policy to deal with t1-belief structures no longer thought to be congruent with reality were *affirmative action programs*. These were indeed conceived by American policy-makers, following the work of Arrow and others, as a way of altering the "filters" or "screens" used by employers who were statistically discriminating against a variety of minorities. Forcing employers to hire members of minorities would lead these employers to discover the real value or productivity of these minorities which in itself would obsolesce the need for affirmative action programs. It is difficult to know how one could get Francophones in Canada to appreciate that linguistic discrimination is largely a thing of the past. The matter is important because the apparent drift toward unilingualism in Quebec is worrisome, not only for the stability of Canada, but because it means that many francophone Quebeckers will earn lower incomes than they would if they were bilingual.

---

[12] Becker postulated a "taste for discrimination" as a component of the preference structure of discriminators, a taste which these individuals satisfy by paying a "premium" above the market price. An example of discrimination à la Becker, is a white consumer who, not to have to transact with blacks, chooses to pay more for a good sold by another white when an identical lower price good is available from a black supplier. Another is a white employee who accepts a job with other whites when an equivalent but more lucrative job with blacks is available. Arrow modeled a situation in which an employer is ignorant of the value (productivity) to her of a potential employee and makes inferences about this value on the basis of "signals" derived from indices such as language, ethnic origin, etc. which have been statistically correlated with productivity.

3c. The Incidence Problem or Who Bears the Cost of Investments in Second Languages?

Two propositions bearing on the problem of incidence—on the problem of who bears the cost of investing in second languages—have so far been established. First, that as long as countries have roughly equal populations and national incomes, and as long as investments in second languages are made to reap the benefits of gains from trade, the costs are symmetrically borne by the two countries. On the assumption of equal size, but with investments in second languages governed by non-economic or non-trade motives, the costs are borne by those who learn the second language (for non-economic or cultural reasons), but the benefits in terms of the prices of the products traded are symmetrically borne.

Suppose now that the two countries are of unequal size. To be specific, let England be large and France small, with size defined in terms of the capacity to affect the prices of goods entering international commerce.[13] Continue to assume that the world is made up of two countries. Because France is too small to affect the prices of either wine or cloth, it follows that the prices of goods traded internationally are set by supply and demand conditions in the large country, England.

Taking the intuitively simplest case first, assume that from a situation of trade equilibrium, a technically more efficient mode of transportation is introduced. Who will gain from this innovation? The small-country assumption says that it will be France. Why? Because demand and supply conditions in England not having changed, the prices of wine and cloth in England will not change. Prices will fall only in France, and it is the French alone who will benefit from the technical innovation.[14] For similar reasons, it is France—the small country in this discussion—that bears the cost of learning the second language. The reason is simple. If bilingual individuals are needed in the trade process and if these individuals have to be attracted by financial rewards to become bilingual, the prices of traded goods have to rise. But they cannot change in the large country (England) and consequently will rise only in the small one (France).

---

[13] This, in other words, is the small-country assumption often made in the pure theory of international trade.

Two important points must be noted. First, that the individuals who become bilingual are compensated for their investment (otherwise the investment would not be undertaken) and consequently do not themselves carry the cost of learning the second language. That cost takes the form of a general rise in the prices of traded goods in the small country and therefore of a fall in the real incomes of all members of that small country.[15] Second, real incomes in the small country fall irrespective of who—whether persons in France or in England—become bilingual. Again the reason follows immediately from the small-country assumption. It makes no difference to real incomes whether individuals who invest in a second language are residents of France or of England, that is, whether they are residents of the small or of the large country.

The small-country case is useful to emphasize the nature of the forces at work, but it is obviously a polar case. If a small country is selling a differentiated product—that is, a product with idiosyncratic and exclusive characteristics—that country, even if small, will have an influence on the price at which the differentiated commodity it sells will trade. There are a number of countries in that situation: we mention France with its wines, Italy with its fashions and designs, South Africa with its diamonds, and Switzerland with its watches. When a differentiated product is traded, the burden of the costs of transportation and of communication will somehow be shared by the residents of both the small and the large countries.

---

[14] The benefits of the price reduction will not accrue equally to everyone in France. Indeed, the distribution of the benefits will depend, in the first instance, on the proportion of cloth in the budget of French consumers.

[15] The fall in real incomes will not affect everyone in the small country equally. The incidence of the higher prices of traded goods will depend, in the first instance, on the weight of these goods in the budgets of French households.

In the Canadian context, the evidence is clear that historically Francophones have invested, on the average, more resources *per capita* in the learning of a second language than have the Anglophones. In some cases the volume of resources so invested was no doubt small, but in other cases it was significant. In both cases, it must be presumed to have been the volume of investment that maximized wealth. In that context, the language programs of the Canadian Government, especially those related to the promotion of official bilingualism, meant that Francophones could engage in the same volume of exchanges—broadly defined to include, beyond private and public trades, various forms of social interaction—with Anglophones without having to invest as much as hitherto in a second language. It is therefore important when appraising the resource costs of official bilingualism in Canada to adjust these costs by subtracting from them the resources no longer invested by Francophones. To the extent that the language policies introduced by the Canadian Government in the 1960's and still implemented have had this effect, they have, without doubt, altered the incidence of investment costs in a second language —shifting the burden on the average away from Francophones toward Anglophones—but it is an empirical question how costly these policies have been. In principle, it is possible that the aggregate resource cost of investments in the learning of a second language in Canada, correctly normalized for the volume of goods and services exchanged between the two language groups, has fallen over the last thirty to forty years, even though the number of bilinguals in Canada over the same period has more than doubled.[16]

3d. Cultural Consumption Benefits

The trade model, because it can be extended to all domains in which one thing is exchanged against another, provides a solid basis for understanding many of the problems associated with the learning of languages. That notwithstanding, it is important to realize that resources may be invested in the improvement of a first language and in the learning of a second language for non-trade reasons—for what could be called cultural reasons.

---

[16] In 1951, 1.7 million Canadians were bilingual, whereas that number had grown to 4.4 million in 1991.

Investments in first languages can be motivated, firstly, by a desire to have a greater knowledge of one's own mother tongue, so as to better appreciate and enjoy its literature and its poetry; investments can be motivated, secondly, by social pressures forcing one to conform to higher standards of speech and composition in an evolving cultural environment; investments can be motivated, thirdly, by an appetite for social interaction with the "better" circles of society. In all these cases and in others more or less like them, the yield on the resources invested in improving first languages is cultural.

Investments in second languages can also have a cultural motivation. That would be the case if what was sought was the enjoyment of literature, poetry, cinema, opera, and theater in the language in which these cultural expressions were originally formulated, if that language was different than one's own mother tongue. It would also be the case that investments in second languages would be cultural if the motivation for learning the languages was a desire to interact with members of the collectivity whose language was the investors' second language.

It should be noted that the examples just listed of culturally motivated investments in languages are all consumption activities. In other words, the resources allocated to the improvement of first languages and to the learning of second languages are not related to the production of larger monetary incomes. Later in the paper, we look at culturally motivated investments in languages that are not in the nature of consumption activities.

3e. The Individual Investment Decision

Over the longer term and considering aggregates of people, it is reasonable to suppose that all forms of financial, physical, and human capital are substitutes for each other. If that proposition is accepted, it follows that the amount of resources invested in first and second languages will depend on the expected yield accruing to those assets relative to the yield expected from alternative assets. If *all* assets were competing equally for a place in the "portfolio" of individuals, we would expect that an increase, expected to be permanent, in the rate of return on long-term bonds—the yield on other assets remaining the same—would induce individuals to shift resources away from the learning of languages towards long-term bonds. Though there appears to be some rough tendency to equality of the yields on assets generally—a tendency that lends credence to the assumption of substitution between assets—there also appears to be systematic differences in the yields accruing to certain classes of assets.

Three classes of capital, namely financial, physical, and human, have just been mentioned. There are reasons to think and evidence to support the view of a systematic yield differential between financial and physical assets on the one hand and human capital on the other. Earlier in this paper, we noted that the property or ownership rights that most of the time attach to financial and physical capital are very different than those that attach to human capital generally. That by itself, we then noted, would be sufficient to forge a wedge between the yields to these two classes of assets. The size of that wedge will depend, to a degree, on how well the "rental market" for human capital is operating.

We have earlier noted that those who have the responsibility for making the decisions related to the formation of human capital in children—parents, teachers, and governments—often do not allocate a sufficient volume of resources to education and to the learning of first and second languages which is a component of education. The volume of resources is not sufficient in the specific sense that at the margin, the cost of resources invested in languages is less than the yield. That also will prevent an equalization of net marginal yields on various forms of capital.

In addition, it would seem reasonable to assume that the assets with which the learning of first and second languages are competing are other forms of human capital. In other words, the amount of resources invested in learning a particular first language and a different second language would be determined by the yields on those assets relative to the yield on other forms of knowledge, on health, mobility, and on learning-by-doing.

We must therefore conceive of a typical individual facing a large number of assets—such as English, French, Italian, history, mathematics, economics, management science, music, mobility, health, and all the other assets that constitute the class labelled human capital—among which she wished to allocate some of the resources (money, time, energy) that she owned or could borrow. Her decision would be governed by a desire to maximize the value of her wealth. Consequently, she would invest in those assets that given her preferences, abilities, and previous investments, have the highest net yields.

4. NETWORK EXTERNALITIES AND *LINGUA FRANCAS*

We have so far been concerned exclusively with forces that help determine the net private economic or cultural consumption yield on languages. We have, in other words, implicitly been assuming that the private and the social yields on languages are equal. It is time to jettison this assumption. We do so by first analysing why one language—or, more generally, a few—will emerge as a common language or *lingua franca* and, following this emergence, have a higher net yield attached to it. We then argue that those whose mother tongue or first language is the *lingua franca* benefit from that fact, even if, as is possible, there is underinvestment in the *lingua franca*. In subsection c, we briefly discuss the problem of minority languages in the context of a very rudimentary model of culture.

Before moving ahead with the discussion, it is well to note that the Italian expression *lingua franca* has two meanings and two translations. A first one, which is not relevant to the argument of this paper or to the economic analysis of language, is *frankish language*, namely the language spoken by communities of Frank peoples in what is nowadays Germany, and in those parts of France and Belgium that formed Gaul. That language seems to have disappeared around the 9th century. The second translation, central to an understanding of the economic analysis of language, is best rendered as common language. Originally, it referred to mixtures of Arabic, French, Greek, Italian, and Spanish spoken by Levantine merchants engaged in trade and other activities in the ports of the Mediterranean.[17] In this second sense of common language, *lingua franca* is akin to Italian expressions such as *territorio franco* or *zona franca*—“no-man’s land” or “buffer zone"—and *porto franco*—"open access". As part of that family of expressions, *lingua franca* now denotes any language which is employed as a common vehicle of communication by people of different languages.[18]

---

[17] One *lingua franca* spoken in the Levant—a mixture of Arabic and French—was Sabir.

4a. Network Externalities and the Emergence of a *Lingua Franca*

In the case of many consumption and capital goods, the benefits that a person derives from their use increase with the number of other persons using the goods. That will happen whenever the other users are in the same "network" as the new buyer or user finds herself. Typical examples are telephones, electronic mail, facsimile equipment, but also computer hardware that accept a greater variety of software programs, and so on. In all those cases, the value of the goods increases as participation in the network increases. We are in the presence of network externalities.

To see how the concept applies to languages, imagine a group of ten individuals, each of a different language, who wish to communicate with each other. The communication problem can be solved in two different ways. Each individual can learn the nine other languages and thus be able to communicate with each of the other individuals, each in their own language. Alternately, each individual can learn a second but common language. That common language becomes the *lingua franca*. There is no doubt that of the two solutions, the second is the one that will usually emerge. That is more apparent still if the number of individuals who wish to communicate with each other is not ten, but one hundred.

There can be more than one *lingua franca* existing at the same time, since there is nothing in the nature of the argument just presented that would prevent different groups of individuals in different places from choosing different languages to act as their common vehicle of communication. Geographic location and propinquity to large population masses can affect the number of *lingua francas* and the volume of investment in their learning. Poles, for example, may learn German and Russian because they interact frequently German and

---

[18] I am grateful to Silvana Dalmazzone for helping me to sort out the two meanings of *lingua franca* and to understand how the expression should be used.

Russian nationals, even though English might be used in "wider" contexts. The growth of communication technologies, however, acts to reduce the number of *lingua francas*, for the very same reason that a *lingua franca* arises in the first place. To put it differently, the emergence of new more powerful communication technologies has greatly increased the size of network externalities and therefore the yield accruing to a reduced number of dominant languages. As the process continues, the time may come when only one language is the *lingua franca.*[19]

The view that a *lingua franca* has its origins in network externalities and in the increasing returns that derive from the growth in the number of users which is attached to these externalities is of some importance. Jack Carr (1985)[20], who pioneered in the analysis of this question, as well as Breton and Mieszkowski (1977), whose discussion was greatly influenced by Carr's analysis, were unable to provide a "rational choice" as distinguished from an ad hoc historical explanation as to why one language instead of another would become a *lingua franca*. More recent work on the theory of network externalities (see, for example, Arthur, 1989) has made clear that Carr and Breton and Mieszkowski had unknowingly adopted the only possible approach. Indeed, the increasing returns that derive from network externalities generally give rise to multiple equilibria—in the case of languages, with the possibility that any one of a set of languages could become the historical equilibrium *lingua franca*. Small "historical events" select one language from the set and that one then becomes "locked-in". There is, in other words, no *a priori* reason why English is the current *lingua franca*. The explanation is essentially that the United States appeared on the international scene as the most important commercial, diplomatic, and military power following

---

[19] At this time, the presumption must be that that unique *lingua franca* would be English. However, it is possible that the evolution of the English language in different countries—America, Australia, Canada, India, and the United Kingdom to name only five countries where English is widely spoken—is sufficiently different that over time the ability of English to act as the *lingua franca* may be impaired. It is possible, in other words, that *lingua francas*, like civilisations, are mortal. I owe the idea that *lingua francas* can decay to Giorgio Brosio.

[20] Carr's paper was apparently written in the early 1970's. The version which Breton and Mieszkowski used when working on their own paper (published in 1977, but written in 1974–75) was undated; that which Vaillancourt translated and published was dated 1976. There is no English publication of the paper.

150 years during which Great Britain occupied essentially the same position. Furthermore, the accession of the United States to a position of excellence in science, technology, literature, art, sculpture, music, and all the other fields of knowledge and learning has meant that it is impossible to participate—that is, to read and to be read, to talk and be understood—in these various areas of human activity without some knowledge of English.

4b. Two Complementary Propositions

In this subsection, we deal briefly with two questions related to the existence of a *lingua franca* which can help us better appreciate the complexity of the phenomenon. The first pertains to the seignorage that sometimes attaches to certain *lingua francas*, while the second concerns the "conventional" externalities that are associated with investments in languages, externalities which are different from the network externalities that occupied our attention in the discussion of the last subsection.

i) Seignorage

There is an important economic phenomenon related to *lingua francas*. It is that individuals whose mother tongue is a *lingua franca* receive a benefit from that fact alone. To appreciate that, it suffices to recognize that the emergence of a *lingua franca* is like a new technological innovation which reduces the costs of communicating among individuals and consequently confers benefits to all (though not necessarily in equal amounts) who are communicating. Only those who have to invest resources in the learning of the *lingua franca*, however, pay to reap the benefits. The advantage that accrues from having as mother tongue the *lingua franca* is a seignorage, like the premium or seignorage attached to membership in a key-currency country. (In the case of a key-currency country, the seignorage is equal to the saving in real resources that are replaced by a monetary asset of the key-currency country for the purpose of transacting international commerce).

The nature of the seignorage is possibly more obvious when those who learn the *lingua franca* do so for reasons other than to conduct economic transactions. In that case, the fall in the prices of internationally traded goods is a precise measure of the value of the "free-ride" that accrues to those who have "inherited" the *lingua franca*.

ii) "Conventional" Externalities

When a person invests in the learning of a second language because, from that person's point of view, it is profitable to do so, a benefit is, at the same time, conferred to other persons who already know that language. Why? Because those who already know the language have one more person with whom they can communicate, exchange, and interact. In deciding to invest in the learning of the second language, the individual will not, however, take the benefits accruing to others—those that are external to herself (hence the word externalities)—into account. She will as a consequence invest in the second language less than is socially optimal. Put differently, she will not learn the second language as well as she could. In addition, other persons will do like her so that the number of persons learning the second language will be too small. If the second language is a *lingua franca*, the same set of considerations apply leading to the somewhat paradoxical result that those whose mother tongue is the *lingua franca* benefit from a seignorage, but do not get an advantage that is sufficiently large!

As a consequence of the work done on the theory of externalities, following Ronald Coase's (1960) path-breaking contribution, we know that the size of the underinvestment in, say, second languages is a function of the degree of imperfection in the mechanism that "coordinates" investment decisions. The proposition can be illustrated with the case of telephones. As we have noted earlier, the value of a telephone increases as the number of persons who can be accessed with the telephone also increases. The value of a telephone is therefore very much dependent on the existence of "telephone books", because in the absence of these, the number of persons who could be accessed would be much smaller than the number having a telephone. Any one person can therefore reduce the value of a telephone to others by deciding to have her name removed from the telephone book, to avoid nuisance telephone calls let us say. In the case of telephones there is an effective coordinator, the telephone company or some other agency, that not only publishes telephone books, but also insures that many of those who have a telephone are listed in the book. This coordination is done in one of a number of ways: either by charging a significant monthly fee for being unlisted as is done in Canada and the United States, or by requiring, as is done in Italy, that she who desires to be unlisted explain the reason for that decision in a formal letter accompanied, when appropriate, of a police report describing the events motivating the request—though a fee is not charged, a lump sum of 100,000 lire will have to be paid if the requester changes her mind. These practices and no doubt others more or less like them insure that the coordination mechanism is quite efficient. As a consequence, it is likely that underinvestment in telephones, if it exists, is very small.

It is not obvious that a coordination mechanism exists for investments in languages. Jonathan Pool (1991), for example, has formulated a model that assigns responsibility for the failure of an artificial language—such as Esperanto, Occidental, or Volapük—to emerge as a world language to a "coordination problem". It is possible, however, that in respect of what is the current dominant *lingua franca*, namely the English language, the United States, in its capacity as hegemonic power regulating many international arrangements, imposes English in areas where it would otherwise not be used or where it is not required except to benefit Americans. If that is the case, the extent of the underinvestment in the current dominant *lingua franca* could be small or even non-existent and the emergence of a competing artificial language, lacking a coordinating mechanism, made more difficult.

4c. A Rudimentary Model of Culture

In every group, there are *permanent* values[21] that elicit widespread, possibly general, reactions, responses, and adjustments to events and contingencies affecting all or a significant fraction of the members of the group. These permanent values define the group's culture. We illustrate with three examples. First, we can imagine a group—as large as a whole society or as small as a condominium association—that shares a permanent value such as the mistrust of others in the group, in which case all or virtually all group undertakings would have to be formally guaranteed by a contract, an insurance policy, a bond, or other similar instruments that often create "distance" in social interactions. We can imagine another group—of a given ethnic, religious, or other background—in which a permanent value is the fear of strangers in which case an exogenous occurrence could provoke extralegal reactions taking the form of lynchings, ethnic cleansing, intolerance and discrimination. Finally, we can conceive of a group, one of whose permanent value is lack of respect for the rule of law in which case an external disturbance could lead to the summary execution of suspects, the purchase of private arms arsenals for "self-defence", or the formation of vigilante gangs.

---

[21] The word "values" is not unambiguous even if it is often used in the sense we use it here. The reader can, if she desires, change it for a more abstract word, such as "element" or "entelechies". Values are essentially forces or capacities that elicit responses, reactions, and adjustments.

Any one group will be characterized by a number of permanent values which, to careful observers, will have some degree of prominence. However, in addition to the permanent values, a group will also possess transitory values which, from the point of view of observers, are like random shocks or noise that make it difficult to identify the permanent values. For example, in a group in which a permanent value is mistrust of government, it may be impossible, in a particular situation, to avoid some government intervention, making a demonstration that mistrust is a permanent value more difficult.

The presence in groups of both permanent and transitory values complicates the characterization of cultures in yet another way. Permanent values are, in all likelihood, the product of a Darwinian-like process of natural selection (see Robert Boyd and Peter Richerson, 1985). Consequently, though we have called them permanent, values do evolve—they are permanent in the sense that they evolve slowly within a given specific genotype that is adapted to its "environment".

The purpose of the foregoing outline of a rudimentary theory of culture is to make the point that if from an analytical standpoint, it is not possible to distinguish between permanent values that are "good" and those that are "bad", from a policy perspective such a distinction is possible. Suppose then that in a given group, policy-makers and others that are engaged in the public discussion of issues can "demonstrate" that there are some permanent values which should be encouraged and promoted. Let us further assume that among these permanent values there is a subset that could be encouraged and promoted by investing resources in the learning of a language.[22] In such a case, we would conclude that there exists a cultural yield to language that is different from its cultural consumption yield.

To illustrate, suppose that in a group one permanent value is a sense of solidarity which is deemed essential to the group's social fabric and which is correlated to linguistic cohesion. The learning of the language that supports cohesion will then have a cultural yield. It must be stressed that for the investment in the language to have that sort of a yield, the sense of solidarity must be correlated to language and not to ethnicity, race, or religion. Societies that are successful in the "linguistic assimilation" of immigrants do, in all likelihood, transmit some permanent values through investments in language. In societies in which the sense of solidarity does not extend beyond the ethnic network, investments in language do not have a cultural yield such as the one discussed here.

The foregoing implies that it may be beneficial for a society to invest in the preservation of minority languages, if these languages support and nurture permanent values that are deemed beneficial.

Furthermore, the increased acceptance of one *lingua franca* and the consequent reduction in the use of minority languages, especially when these are known by no more than a small number of persons, imply a more or less rapid depreciation of these languages, if only because of the inevitable reduction in the use made of them. That depreciation may require the investment of resources in the preservation and enhancement of non *lingua franca* languages, if demonstrably valuable permanent values are correlated with them.[23]

---

[22] Jacob Marschak (1965) speculates that the Académie Française, when engaged in "policy-making" in respect of its Dictionary, may be governed by "the goal of preserving national unity" (p. 137).

[23] This line of reasoning to justify investment in minority languages is quite different from that advanced by Edward Lazear (1995). Lazear argues that because resources have to be used to go from one equilibrium to another and because of the impossibility of placing values on different linguistic equilibrium outcomes, the resources used to reach the new equilibrium are wasted. It is on this basis that he supports what he calls Quebec's "chauvinistic" language policies (see Lazear, 1995, pp. 28–32).

5. CONCLUSION

This paper has dealt with a large number of issues related to the investment of resources in learning languages, all within the framework of human capital theory. That theory is not the only one that can be used to address language matters, but the number and variety of problems which the theory allows one to investigate and illuminate is a sign of its power and versatility.

Some aspects of the foregoing discussion are more tentative than others, and as a consequence will require further reflection and research. Among these more tentative theoretical developments, we should mention the model of culture that was adumbrated. Economists have, in recent years, discovered that it is difficult to understand certain aspects of reality without some model of culture (see, for example, Kreps, 1990). As research progresses on this question, applications to languages may be possible and, through these applications, our understanding of this most complex phenomenon improved.

BIBLIOGRAPHY

Arrow, Kenneth J. "Models of Job Discrimination", in A.H. Pascal, ed., *Racial Discrimination in Economic Life*. Lexington: Heath, 1972, Chapter 2.

Arrow, Kenneth J. "Higher Education as a Filter". *Journal of Public Economics*, Vol. 2, July 1973, 193–216.

Arthur, W. Brian. "Competing Technologies, Increasing Returns, and Lock-In by Historical Events". *Economic Journal*, Vol. 99, No. 1, March 1989, 116–131.

Batley, Edward, Michel Candelier, Gisela Hermann-Brennecke and György Szepe, *Language Policies for the World of the Twenty-First Century*. Report for UNESCO, World Federation of Modern Language Associations, August 1993.

Becker, Gary S. *The Economics of Discrimination*. Chicago: University of Chicago Press, 1957; Second Edition, 1971.

Boyd, Robert and Peter J. Richerson. *Culture and the Evolutionary Process*. Chicago: University of Chicago Press, 1985.

Breton, Albert and Peter Mieszkowski. "The Economics of Bilingualism", in Wallace E. Oates (ed.) *The Political Economy of Fiscal Federalism*. Lexington, MA: D.C. Heath, 1977, 261–273.

Carr, Jack. "Le bilinguisme au Canada: l'usage consacre-t-il l'anglais monopole naturel?", translation of "Bilingualism in Canada: Is the Use of the English Language a Natural Monopoly?", in François Vaillancourt (ed.) *Économie et langue*, Montréal: Université de Montréal, Centre de recherche en développement économique, 1985, pp. 29–37.

Coase, Ronald H. "The Problem of Social Cost". *Journal of Law and Economics*, Vol. 3, October 1960, 1–44.

Kreps, David M. "Corporate Culture and Economic Theory", in James E. Alt and Kenneth A. Shepsle (eds.) *Perspectives on Positive Political Economy*. New York: Cambridge University Press, 1990, pp. 90–143.

Lazear, Edward P. *Culture and Language*. Cambridge, MA: National Bureau of Economic Research, 1995 (Working Paper No. 5249).

Marschak, Jacob. "Economics of Language". *Behavioral Science*, Vol. 10, No. 2, April 1965, 135–140.

Migué, Jean-Luc. "Le nationalisme, l'unité nationale et la théorie économique de l'information". *Revue canadienne d'économique*, Vol. 3, No. 2, Mai 1970, 183–198.

Migué, Jean-Luc. *L'économiste et la chose publique*. Québec: Presses de l'Université du Québec, 1979.

Pool, Jonathan. "The World Language Problem". *Rationality and Society*, Vol. 3, No. 1, January 1991, 78–105.

Raynauld, André et Gérald Marion. "Une analyse économique de la disparité interethnique des revenus". *Revue économique*, Vol. 23, No. 1, 1972, 1–19.

Stigler, George J. and Gary S. Becker. "De Gustibus Non Est Disputandum". *American Economic Review*, Vol. 67, No. 2, March 1977, 76–90.

2. THE ECONOMICS OF LANGUAGE IN A VIRTUALLY INTEGRATED GLOBAL ECONOMY

Richard G. Harris
Department of Economics
Simon Fraser University

1. INTRODUCTION

This paper examines the impact of the dramatic innovations in information and communications technology, henceforth referred to as ICT, on the economics of language use and the interaction of language and communications technology with the global economy. The rapid growth of the global communications network we know as the Internet has given rise to a vision of a fully integrated world economy in which people can interact electronically, or *virtually*, wherever they are located, hence creating a virtually integrated global economy. As a result of this virtual integration, it seems necessary to use a common language in communicating. How this technology impacts on the use of language, the returns to learning a second language, and language policies in a bilingual country such as Canada is the focus of this paper. Closely related to the ICT developments have been the increasing economic integration of the world economy, often referred to as globalization. As a small, open economy, that increasingly depends on international trade for jobs and growth, Canada is largely influenced by the globalization process. This paper links the traditional theories of international trade with economic theories of language, to address the question of how globalization and

ICT will affect language use and the international competitiveness of a bilingual Canada.

The main objective of the paper is to develop a conceptual economic framework that will help focus discussions on these issues. Even though we provide some statistical data, we do not intend to perform here an empirical analysis of the links between ICT, globalization and language. We leave that to other scholars. At the moment, the data upon which to base such a study are non-existent in any case and will only become available when substantial resources are made available to systematic investigations. We believe it is reasonable to accept the validity of the two basic empirical "facts" if the arguments of this paper are to be taken seriously. First, that ICT technological use is pervasive throughout the world and is one of the most fundamental technological changes of this century.[1] Second, that globalization as measured any number of ways is a major feature of the world economy in the last decade of this century, and a trend that is unlikely to be reversed.[2]

The paper begins with a review of the interaction between language and communication technologies, and how ICT/Internet type innovations will impact on language use. It goes on to look at the process of globalization, the parallel process of localization, and its impact on language use. These provide the context for what follows. The next section reviews the basic economic theories of language and asks in each case how the ICT innovations alter the predictions of those theories. This is of considerable importance in that the basic human capital theory of language is the conceptual framework for most of the empirical work by economists on language, and is the basis for some aspects of language policy. Emphasis is placed on language "externalities" as the new communications technologies exhibit what economists refer to as *network effects*—a form of interdependency typical in a network of telephones or computers. Networks are characterized by interdependencies which are not mediated by a market price mechanism. As language is an important input to any communications process these network effects are also evident in language use, and the type of market failures that are relevant to communications networks have implications for policy towards language. Section 4 of the paper reviews the basic economic theories of international trade and competitiveness, and looks at how a country such as Canada-bilingual and highly open—will be affected by ICT as predicted by these theories. Section 5 offers some observations on the implications of the analysis for public policy toward bilingualism. Section 6 is a brief conclusion.

---

[1] This point has been argued by a number of social scientists and futurists. A prominent discussion by a Canadian economist is that of Richard Lipsey (1996).

[2] On globalization trends see Harris (1995).

2. GLOBALIZATION, REGIONALIZATION AND LANGUAGE

2.1 New Communications Technologies and Language

i) Language and Communications Technology: General

A central theme of this paper is that the new communications technology as described above will fundamentally alter some aspects of language use. The traditional communications technologies—books and papers for the written word, and telephone for speech— are the means by which communication occurs which is durable across time and space, other than that embodied in the memory of individuals.[3] Both the sender and the receiver must understand the language used in a communication. An economist might say that language is an *essential input* to the output of the activity called *communication*. Communication itself may be a final consumer good valued for its own sake, or be an input to other productive activities in the economy. Communication is a critical, perhaps defining, input to virtually all coordinating activities in the economy—whether within firms, markets, or bureaucracies. A useful working hypothesis is that the communications medium most likely to be used is that which is most efficient for the purpose at hand. Because language is an essential input to communication an extension of this hypothesis due to Marschak (1965) is that only those languages which are the most efficient will be used. It has been argued for example this is why Chinese script language is being displaced by English for written communications—it is simply less efficient to write in one language relative to the other.

---

[3] The reader will note that broadcast media such as television and radio are not considered in this paper. While relevant to the topic, the focus here is on the economic integrating aspects of ICT and Internet technology which allow for two-way exchange between individuals and business.

Most communication occurs with the use of one language. However in some cases communication occurs between those speaking different languages through the use of translation. The essential content of a communication, written or spoken, is translated by someone who is fluent in both languages. Translation is a costly activity and, therefore, limits the extent to which communication between monolinguals occurs. The need for translation increases the demand for bilinguals who are capable of translation. On the other hand the existence of bilinguals increases the extent of transactions between monolinguals by effectively increasing the supply of translation services.

ii) The New Communications Technologies

It would be impossible to provide a complete description of the new communications technologies or more precisely the linking of communications and computers or ICT. The general term *information highway* is also used to describe essentially the same technological developments.[4] Its general character is described by Stentor as "...a system of interconnected electronic networks providing universal access to basic and advanced communication and information services. It is a network of many networks, owned and operated by different service providers offering connections to a variety of services, applications and content sources" (Stentor, 1993, pp. 6–7). The new communications technologies through high speed network connections, digitization, data compression and other techniques allow for the exchange of text, voice, image and video data across vast distances virtually instantaneously on both public and private networks. It is now possible to use a wide variety of communications media such as wired and wireless telephones, cable systems, satellites, and computer networks to share and exchange electronic traffic. The term *Internet* is now used generically to describe such networks, while the term *Intranet* is commonly used to describe a network which is restricted to limited set of users, such as employees of a given firm. Physically both type of networks occur using a wide variety of physical links. These technologies essentially break the spatial barrier previously imposed on face-to-face interactions.[5] Video conferencing for example allows individuals in different locations to have a *virtual* face-to-face meeting. The combination of the ability to link data sets and provide extensive virtual meetings allows organizations to spread their activities across space in ways that were unheard of only a few years ago. Complex service transactions routinely occur over the Internet in areas such as engineering, design, marketing, accounting, finance whereas these previously would have required buyers and sellers to physically meet.

---

[4] Descriptions and implications of the information highway are given in Globerman (1996) and Stentor (1993).

The entire ICT revolution hinges on the process of digitization or the process of converting sound, images, text, and video to a series of electronic 1's and 0's . One aspect of digitization course has been the development of mass storage devices, such as hard disks on personal computers, which are readily available at a very low cost. The existence of these type of storage devices has reduced the need for paper media (books, paper files, documents, etc.). With this has come an increase in general of *record keeping* by firms, governments and individuals. Record keeping refers to activity in which information is stored, i.e. made durable, for some future use. As digitization of libraries and databases proceeds together with on-line access to these via ICT technology, the available stock of material written in all languages will increase dramatically. It is difficult to know whether or not an increase in record keeping will result in greater standardization in the use of language. Certainly in some cases standardization will be called for. Shared databases within an Intranet may become the most important organizational capital good of the firm—and therefore the language in which a databases is written will be an increasingly important issue. To the extent organizations must share information with customers, suppliers, or divisions located around globe, there exist strong incentives to have databases in single language. Note that in the case of many databases in text form the value of a common *written* language will be enhanced within such organizations, even though speaking the language may not be as important.

---

[5] Economic geographers such as Abler and Falk (1981) were among the first to recognize the economic impact of these technologies, as well as popular futurists such as Toffler (1981).

An important aspect of ICT is its impact on the geographic organization of the activities of firms. It has the capability to lead to vertical disintegration of the firm, with activities previously agglomerated at one location spread across many. At the same time the geographic boundaries of the firm have been extended allowing for larger and more numerous *global firms*. If organizational disintegration is possible, then it may occur along linguistic lines if the communications interface along the organizational links is not language intensive. For example think of a manufacturing firm producing different components in different countries. An automobile firm can produce engines in one region where French is the working language of that division, and tires in another Spanish speaking region for example. Extensive communication between these divisions may not be necessary. On other hand in communication intensive organizations, for example accounting firms, a common language is important and globalization of organizations achieved through Internet technology will promote the adoption of the lingua franca within the firm.

While there is no hard data on the impact of these technologies on the amount of communication undertaken, many believe that the net effect of these technologies has been to increase the quantity and quality of communication.[6] If one accepts this hypothesis its corollary is that the use of language has also risen. Part of the process of *globalization* has been the increased connectivity of individuals and organizations achieved through these technologies and a consequent increase in the transactions across large distances. An early and prominent example of this was the market in foreign exchange organized in the 1970's using then standard telephone and cable technology. As globalization has increased the demand for communication it has also led to an increase in the demands for compatibility between senders and receivers, and thus has led to greater standardization in the use of language and renewed calls for a universal lingua franca.

---

[6] There is a great deal of evidence however on growth of the Internet measured by domain addresses and websites. This is strongly suggestive that effective communication within these networks is rising rapidly. See Globeman (1996) for discussion of the measurement issues.

The general presumption of many observers on international use of language is that English is the de facto lingua franca of the global economy. Estimates vary but it is estimated that roughly 450 million people speak English, which is second after 885 million Chinese speakers. According to Crystal (1995)[7] over three quarters of the world's mail is in English, three quarters of the world scientists read in English, 80 percent of the world's electronically stored information is English and the majority of communication on the Internet thus far is in English. One survey carried out by a European marketing consultancy estimated that in the beginning of 1996 there were 9,600 host computers on the Internet using English. The next closest language group was German with 452 hosts. The domination of English on the Internet seems at this point overwhelming.[8]

On the other hand the effective market size of any particular language is increased by the new technologies, especially when those using the language are dispersed geographically. A good example would be Francophonie[9]—those speaking French in Africa, Asia, Europe and North America for example can now routinely engage in transactions that otherwise would not have been possible only a few years ago. Within Canada Internet type technologies allow the use of French by those located anywhere in the country, provided the party with which they are communicating is also connected to the relevant network. For these reasons the effective economic domain of many languages whose users are globally dispersed has been substantially enhanced by these technologies.

iii) Other Related Technologies: Language Translation Software

An important development which as accompanied the improvements in ICT technology are computer translation software. Currently the capabilities of this software are limited and the quality is not generally regarded as very high. Nevertheless routine machine translation of documents is now done in some large organizations and the software is improving at a very steady rate. Experts believe that within a few years machine translation of written text will be close to that now achieved by human translators. In conjunction with Internet type technology this may have a strong impact on the use of language. Senders and receivers will be able to communicate at least in written form at a very low cost. This will reduce to a considerable degree the demand for a universal lingua franca and enhance the economic value of minority languages. In face-to-face communication however the need for a common language will continue to exist.

---

[7] See David Crystal (1995).

[8] Reported at website http://www.euromktg.com/eurostats.html.

[9] For a description and definition of Francophonie and Canada's role see Pelletier (1985).

2.2 Globalization Versus Regionalization

There is a strong link between the literature on globalization and ICT technology which is worth briefly reviewing because of its relevance to the question of language use. ICT is regarded as one of the principal drivers of the process labeled as globalization. Writers on globalization discuss a variety of observed changes in the world economy: an increase in the size of the global economy with the emergence of the high growth economies of Asia, the increase in the volume of international trade and foreign direct investment, the outsourcing to lower wage countries of manufacturing in the developed countries, increased flows of financial capital across international borders, the reduction in the power of the nation state due to economic constraints, the emergence of regional trading organizations such as the North American Free Trade Agreement (NAFTA) and the Asia-Pacific Economic Co-operation (APEC), and the increased role of multilateral political organizations. In the absence of modern communications technology it is clear most of these developments could not have occurred.

One of the principal concerns about globalization is that it leads to a process of economic agglomeration in which the big get bigger and the small get smaller—both in terms of size and per capita income.[10] But at the same time that agglomeration occurs, it is also argued by some that *localization* is a parallel process. Localization is a process by which the local/regional economy becomes relatively more important to individuals and business at the same time that the world economy globalizes.[11] The common presumption is that the loser in this process is the traditional nation state, unless it also happens to be a large fully integrated region—for example the European Union (EU) or the U.S.A. There is no data supporting in a formal way the presumed link between globalization and localization, but it has been widely written about in a number of popular books on the global economy by well known names such as Naisbitt, Reich and Ohmae, and is credited as a factor in the breakup of former centralized states such as the Soviet Union. The links of this debate to language use is clear. Globalization at one level requires economic standardization and this increases the demand for a single lingua franca—most likely English. The process of localization, by enhancing the role of *the region*, places a greater emphasis on an important defining characteristic of a region—the native language of that region. It is therefore possible that globalization, by contributing to localization, may actually result in increased interest in minority languages and in the demand for formal training in that language. Furthermore global business that must ultimately sell locally will require trained multilinguals for the purposes of distribution in those markets.[12]

---

[10] This is a major topic amongst contemporary socio-communication theorists . The famous Canadian economist Harold Innis was among the first to notice the impact of changes in communication media on spatial economic organization. See Innis (1950).

Economic theory does not typically work within the globalization-localization framework. Traditional international trade theory however generates predictions as to the extent of international trade in a country depending upon factors such as country size, the costs of international trade versus domestic trade, and the organization of firms. In these theories there is a natural theoretical outcome corresponding to increased "globalization". The implications of the ICT revolution on the interaction between language and international trade will be explored in the sections that follow.

---

[11] Harris (1995b) provides a summary of, and references to the localization-globalization debate.

[12] There is still considerable agreement that knowledge of the local language is important for business purposes. See Emmans et al. (1974), Fixman (1990), Freudenstein (1980), Garcia and Otheguy (1994), Reeves (1990), Shipman (1992), Skapinker (1986), Stanley et.al (1990), Whitehall (1988) and the *New York Times*, Sept. 12 1991 "When a Deal Can Turn on a Phrase".

Localization is a more recent and somewhat controversial concept. There are no well developed economic theories which explain the emergence of something called "localization" as a natural outgrowth of "globalization". The rudiments of a theory however are evident in the popular writing on the subject. In what follows an explanation based on the economists theory of demand is offered. The basic idea is rooted in individual preferences which are "localized" in nature—meaning preferences have a locational, historical and cultural dimension which are unique. Individuals can be thought of as having preferences over characteristics of good in the price, quality and the "locality" dimension. For example one values certain goods because they come from one's own region, are familiar from childhood, or are delivered in one's native language. This characteristic of "locality" may be traded off against other characteristics such as a lower price or higher quality. Globalization results in a greater standardization of many goods with the benefit that either or both are available at a lower price or higher quality. As globalization proceeds traditional measures of consumer real income improve due to these lower prices and better qualities. However there has been a cost to this change in the form of diminished "locality" of the available set of goods and services. By consuming "global brands" consumers give up those local/cultural characteristics of goods that were valued in their own right.

As globalization extends to cover a wide range of goods and services, the number of these which continue to be provided locally are diminished. Suppose now we assume the existence of an objective aggregate index of "locality" derived by summing the locality content of all goods consumed. Holding the prices and qualities of goods constant, increased globalization reduces this index of locality. Conventional economic analysis of substitution effects implies that as this characteristic becomes relatively scarce, consumers will respond by bidding up its implicit price. As globalization has reduced the available supply of goods with high locality content, consumers therefore increase their demands for those goods still on the market which provide "locality". The supply side of the market responds to these demands by increasing the degree of "locality" in those goods where global competition pressures are less evident. A good example in Canada has been the emergence of the microbrewery market. As beer markets have globalized a large number of local breweries have emerged which cater to local tastes. "Locality" of preferences are quite important in the area of cultural goods (e.g. newspapers) and what we often think of as local quasi-public goods (e.g. local sport teams). In each case it is much easier for these to compete with global substitutes on the "locality" dimension rather than on the price-quality dimension.

The implications of this analysis for minority languages become evident in the various theories discussed below in which the demand side of the market is stressed. While ICT promotes globalization, it also raises the marginal value of localization and these increased demands will be met to some degree by increased demands for goods and services (both public and private) which have a high local language content. One could argue that localization of preferences might properly be viewed in the long run as endogenously determined, and indeed the sociological literature takes this view.[13] Extreme globalization would be viewed as a situation in which all such geographic/cultural specificity of preferences is eliminated. This paper will not attempt to address this larger question other than to acknowledge it is one possibility, but one that at the moment seems as remote as the possibility of a single global language outcome. The issue of the impact of ICT on globalization versus localization will be evident in many of the central themes taken up in this paper.

Thus far most economic integration has occurred on a regional basis, where "region" is defined in the larger sense as a grouping of sovereign nations.[14] Countries geographically adjacent have joined formal regional economic integration areas such as the European Community or NAFTA. ICT however may lead to a form of *virtual economic integration* based on non-spatial complementarities, as the communication barriers to exchange are reduced. One obvious complementarity is a common language. Promotion of localization may occur because of the virtual economic integration of language groups separated across space that ICT makes possible. A larger linguistic group raises the probability that a given language will be used for personal and commercial purposes in any particular location.

---

[13] In Harris (1991) a model of trade with endogenous preferences in which goods are distinguished by nationality of origin is developed. One of the consequences of endogenizing preferences is that welfare statements become extremely difficult to make.

[14] Note that this definition of region is quite different than that used in the localization literature, where the term is used as in the more conventional terminology of regional economics—as in Quebec or New England as a region.

This induces more people to learn the language, or at least to retain its use, at the same time that globalization is occurring. If local services are delivered in the local language then we can say that the localization accompanies increased use of the local language.

It is commonly argued by many communication theorists that ICT technology results in increased concentration of social and economic power at the centre to the detriment of the periphery. This argument relies on the notion that there are strong economies of scale in the collection and distribution of information. Large organizations are able to benefit from these economies, and a positive feedback effect is set up which leads to larger organizations on the world scene. This has negative consequences for the local economy and smaller local based business. The common vision of MacDonald's, a global service firm, replacing local restaurants is often invoked. Culture and business becomes standardized due to the ability of large organizations to function effectively across the globe. Clearly if these forces were predominant, they would naturally be accompanied by decreased use of local languages, and greater use of the lingua franca.

There is little hard evidence as to whether ICT is leading to greater or less localization, and localization to a greater or lesser use of local languages. Both sets of forces are evident and the dynamics of the process are highly uncertain. It may be the case that ICT will promote the use of some languages which seemed previously in decline, and yet may at the same time lead to decreased use of others. Sociolinguists often refer to minimal critical mass in the discussion of language extinction—a certain minimum number of users is necessary for a language to survive, below which it inevitably disappears.[15] In the presence of multiple languages, use of one language for a particular purpose may displace use of another language. The Internet technology may induce a decrease in the use of a larger number of minority languages which have thus far have had little international business use. As there is a reduction in the use of some languages there will be a the displacement effect into other languages; for example use of French, Mandarin, and Spanish may rise to a greater extent than use of English. ICT may therefore ultimately lead to a situation in which there are (a few) global languages but with the ultimate demise of many geographically concentrated and isolated local languages.

---

[15] See Fishman (1972), Ambrose and Williams (1981) and Grin (1989).

3. ECONOMIC THEORIES OF LANGUAGE

In this section the economic theories of language are reviewed and their implications for the changes that ICT technology may bring to the supply and demand of languages is taken up. The economics literature on language is surprisingly small, and much of that is empirical.[16] In this section the focus is on alternative conceptual frameworks that economists have used in examining language. To the non-economist the difference between these theories may not appear evident. Each uses the common language of economics and there is a great deal of intersection between the approaches in that all are based on traditional neoclassical microeconomic theory emphasizing individuals' maximizing behaviour and the role of markets in setting prices and rates of return. The differences among them are really a matter of emphasis. The first (and oldest) theory is the human capital model, which stresses that language acquisition by individuals is an investment decision with up front costs and future (and uncertain) benefits (as in any form of education or training). The human capital approach brings to bear the large literature in economics dealing with the determinants of investment decisions and their consequent effects on the supply of capital goods in the economy. The second set of theories deals with social interaction aspects of language that are treated in the economics literature as *network externalities*. In common with many communications networks a language is useful because others use it, and this gives rise to a natural form of social economy of scale in the use of a particular language. In this literature there is a presumption that the benefits of speaking a particular language do not accrue entirely to the individual learning that language. There is a prima facie case that a free market in language choice will not result in a socially optimal outcome. The third set of theories discussed emphasize the interaction between geography and language. Language use is naturally concentrated geographically. Over time however as a consequence of trade and the migration of individuals, a region's pattern of economic specialization and linguistic composition can change. It is the long run dynamics of this process that are emphasized here.

---

[16] Some recent reviews include Breton (1997), Coulmas (1992) and Grin (1996) and much of the recent Canadian relevant material is covered in Department of Canadian Heritage(1997).

3.1 Language as a Human Capital

Virtually all economic models of language depend in some way on the basic supply and demand framework derived from the human capital framework.[17] The acquisition of a second language is a general skill which has value by virtues of its ability to provide individuals the ability to interact with a larger group of individuals. Its great strength is the ability to make predictions about the wages of those with different linguistic capabilities. The theoretical framework was originally set-out by Breton (1964) and extended to a general equilibrium framework by Breton and Mieszkowski (1979). In its simplest form it assumes that the benefits and usefulness of a second language are entirely appropriable by the individual undertaking to learn the language, and that languages are learned only for their potential economic benefit, rather than for personal or cultural reasons. The basic theory is built upon the traditional Marshallian model of a competitive industry. Assume that language training is provided by a competitive industry that provides learning at marginal and average cost. Under these conditions in a market equilibrium prices will be set in labour markets and in the language training market such that individuals learning a second language will be compensated by a favourable wage differential, such that the present value of the additional earnings just compensates for the cost of learning that language. Included in "cost" are the foregone earnings due to time spent learning the second language. The value of the second language, in whatever use it is put, reflects the additional productivity that skill brings to the production, marketing and trading activities in which it is used. Language is almost always thought of as a *general* as opposed to a *firm specific* skill, and therefore individuals are the primary agent responsible for investment in the acquisition of additional language training.

A common application of the theory is to the case of a minority language user learning a majority language, or a lingua franca, which is widely used for business purposes. The additional earnings are assumed to reflect the productivity benefits that communication in the lingua franca bring. The origin of language used as the lingua franca is not necessarily explained in the analysis. The distributional implication of the theory is that individuals whose mother language is the lingua franca earn an economic rent, reflected in their wages, which exist as it is not necessary for them to acquire the lingua franca. Minority language individuals must learn the lingua franca, and therefore must bear the cost of that learning.[18] As Breton and Mieszkowski emphasize the analysis is not complete unless one asks what determines the prices of the goods and services in the economy. In an economy in which all prices are set internationally there can be no price adjustment effect and all differences must be reflected in wages and the cost of training. If some goods and services are provided locally, and not traded internationally, then there is question of what language is used in production and distribution of those goods and how the price of those goods is determined. If language training is necessary for the production and distribution of non-traded goods then consumers will bear part of the cost of that training in the form of higher prices.

---

[17] The literature is fairly extensive and much of it by Canadians. A non-exhaustive list includes Breton (1964), (1978), Chiswick and Miller (1988), Grenier (1982), Migue (1970), Raynauld and Marion (1972), and Vaillancourt (1985).

It is commonly argued there are failures in the market for human capital which may lead to an underinvestment by individuals in the appropriate level of education and training if all educational markets were privately organized without government intervention. These failures may occur for a variety of reasons: inability to legally create transferable property rights over the future wages of individuals; non-diversifiable income risk that occupational specialization entails; and informational asymmetries in the market for educational loans which leads to inefficient credit rationing of those borrowing for educational-training purposes. Government intervention in the form of subsidies to education are usually viewed as the appropriate policy response to these problems. All of these market failures may exist in the case of language acquisition but it is difficult to rationalize any additional subsidies specific to language training, rather than more generally for education, unless one can identify additional marginal social benefits due to market failures specific to language-learning.

Language of course is not only learned, it is used, and as such the use to which it is put may be subject to subsidy, taxation and/or regulation. Within the human capital framework regulatory interventions on language use shift the demand curve for language, and thus impact on the supply of those learning the language by affecting the returns to the language. A general principle of optimal, or first-best, policy design is that a market failure should be corrected as close as possible to its source. Thus if there is a failure in the language learning market the correction should be applied at the source. For a variety of practical and political reasons however this dictum on policy design is widely disregarded in practice. In the case of languages if it is deemed that not enough individuals are using, or learning, a language, then regulations regarding the necessary use of that language may be a *second-best* policy response. These regulations may raise the cost of doing business and thus shift the burden from the government (or taxpayer), who would otherwise be providing subsidized language training, to the consumer in the form of higher prices. A deeper explanation of why such policies are used requires an appropriate positive theory of politics.

---

[18] Breton and Mieszkowski (1979) and Breton (1978) pursue the distributional implications of this asymmetry under a variety of assumptions.

i) Human Capital Theory and ICT

How can we think of the recent developments in ICT in light of the human capital approach to language? The new communications technologies can be thought of as impacting upon the supply and demand for languages, and language learning, in a number of ways. It is helpful to elaborate on the concept of a commodity or service characteristic labeled "language". It is useful when thinking about ICT developments to think of the primary economic activity as "communications"—a produced intermediate service used in virtually all organizational aspects of economic activity. Communication cost reflects the technology of providing communication services, the inputs to the production of communication services, and the price of those inputs. Language skills, the ability to read and write and/or translate between languages is one such input. We can think of ICT as providing new and different ways of providing communication services. Because it is a technology which substantially reduces the cost of communication, especially over longer distances, we expect that its widespread adoption will give rise to increased demands for the business input "communication services", not the least of which is because of its ability to expand effective market size and allow greater specialization over larger geographic areas.[19]

---

[19] In our discussion of international markets in section 4, this aspect of ICT will be dealt with at greater length.

As an essential input to communications services the demand for language skills should rise as consequence of the increased availability of ICT. However language skills are for the most part, excluding computer translation software, embodied in human beings, and these individuals have other characteristics which contribute to their bundle of human capital. ICT technology is only useful to those capable of using it effectively. Therefore the increased demand for language skills due to ICT should fall primarily on those workers who have *both* the technical and language skills. Consider the Breton-Mieszkowski case of a minority language group of a small open economy having to acquire the lingua franca in order to engage in international trade. The introduction of ICT raises the degree of internationalization and increases the demand for those who jointly supply the ability to work in the lingua franca and to use (and supply) ICT services. Holding international prices constant this will raise the returns to those having both sets of skills and reduce the returns to minority language monolinguals. The wages of bilinguals who are not capable of working with ICT may or may not increase. At the margin non-computer literate bilinguals will be pushed into those activities where the ability to work in the lingua franca is important, but ICT technology is not. As ICT technology becomes more pervasive those type of jobs become more scarce, and therefore eventually the wages of the group competing for those jobs should fall.

On the supply side there are two sorts of effects. One, the cost of language learning will be reduced to some extent by computer-aided learning technologies. How important this effect might be is yet to be determined, but it should lead to a reduction in the wage premium to those acquiring the lingua franca, other things being held equal. Second, and more importantly, within any given geographic labour market, the introduction of ICT will increase the availability of language services to business. These services will be made available via technologies such as the Internet and video-conferencing. Imagine for example someone in a minority linguistic region who wishes to market a particular product in a foreign market. These services can be purchased by specialized multilingual international marketing firms via the Internet, rather than produced by the firm itself. The increase in the international supply of language services reduces the scarcity of those capable of working in both the home language and the lingua franca. Holding demand for these services constant, this effect would otherwise reduce the bilingual wage premium relative to home language monolinguals.

The net impact on bilingual wages depends on the relative magnitude of the increased demand for workers who are bilingual, and on the effective increase in the international supply of language services. The argument made above was simplified by focusing on the impact of ICT on one regional economy in isolation. In reality ICT is being introduced around the world and similar effects will be felt everywhere. If the global demand for multilingual communications services rises sufficiently then the prices of foreign language service providers will also rise, mitigating the negative effect on the wage premium to language acquisition noted in the discussion of supply.

The policy response of governments to perceived market failures in language markets will also be affected by ICT innovations. An obvious implication of course is that, to the extent the cost of language acquisition has been reduced by this technology, governments may be more prone to subsidize the use of modern computer aided instruction if they perceive a need to increase the number of bilinguals in the economy. They may also perceive that the bottleneck in the labour market is not with the number of bilinguals, but rather with bilinguals capable of using ICT. In this case the response would be to target computer training at bilinguals. ICT may also lower the direct cost to governments, or increase the effectiveness, of regulating the use of language. For example a government run software search engine could check Web sites on the World Wide Web for the language used. This information in turn could be used for enforcement of language quotas on the Internet, analogous to the current discussions about the regulation of pornography on the Internet. In general the potentially invasive nature of this technology when used by governments so inclined raises the prospects of greater use of specific regulations to enforce or promote the use of a language, rather than the use of more general supply oriented policies. How societies will reconcile the use of such technology to promote a specific language use in the face of other social objectives such as privacy, and freedom of speech will undoubtedly be one of the more difficult policy issues in the near future.

3.2 Languages and Network Externalities

i) Language as a Single Communications Network

Languages, as in the case of other technologies for communication, exhibit what economists refer to as network externalities.[20] That is the value to an individual of the use of a particular communication device, for e.g. fax machines, is useful only to the extent that others have a compatible device. In these circumstances the adoption by one individual of a specific communication device confers a social benefit on all those using a compatible technology. In the case of language, an individual that chooses to learn a particular language confers a benefit upon all those currently using the same language. When network externalities exist private investment decisions on technological adoption will not result in an optimal allocation of resources. This is because the balancing of private costs against private benefits does not take into account consequences of that decision for the size of the network and thus the benefits to others on the network. When the individual's choice is between two competing and mutually exclusive communication technologies, a switch from one technology to another confers a cost on all those using the discarded technology, as the size of their compatible group has been diminished. The case of the Betamax versus VHS video format is a common example of the rivalry between two competing devices, the use of which both exhibit an economy of network size. When an individual switched from Beta to VHS they conferred a benefit on existing VHS users and a cost on Beta users. Neither of these costs or benefits are incorporated in individuals' decision criteria. When individuals make a choice to use, in a relatively permanent sense, one language or another, a similar set of costs and benefits arise and thus a discrepancy arises between privately determined language choices and those that would maximize social efficiency.

It has been argued, by Carr (1976) for example, that it would be most *efficient* if all communication were conducted in one language, thus minimizing aggregate communication costs. Network externalities give rise naturally to social increasing returns associated with single language use—in effect language use is like a natural monopoly. If there are two languages, both of which are equally efficient at communication, then the existence of a network externality dictates that the efficient outcome would be the use of one language-monopoly. It is possible, as described by Church and King (1991), that a free market in language choice with network externalities would result in bilingual outcomes even though this is not efficient. In this case an appropriate policy response is to subsidize the use of one language or the other. With different sized language groups the cost minimizing policy in these circumstances is for the minority group to invest in learning the majority language—a limited form of biligualism.

---

[20] The economics literature on networks is quite large. Some recent surveys are Economides (1996) and Katz and Shapiro (1986) (1994). Specific applications of network models to language include Church and King (1993), Grin (1989), and Laitin (1994). Closely related are the earlier models of Carr (1976) and Hocevar (1975).

ii) Network Systems

The network literature also examines what is the now commonly recognized problem of competition among *network systems*. A communication network for example consists of both hardware, (e.g. the telephone lines and computers) and the software, which allows different computers to communicate. The overall system consists of these complementary software products, the purchase decision which in principle is made by many different individuals, together with the hardware infrastructure linking them. There are many examples of network type systems competing with each other. VHS versus Betamax, PC's versus Mac's and so on. In the case of languages the natural analogue is multiple languages competing with one another, and the obvious questions arise regarding the benefits to standardization and compatibility between competing systems. Software competition is one factor which affects the prospects for system survival. In choosing to purchase a particular piece of hardware the size of the *installed hardware base* of the system is another critical factor. The larger the installed base the more reason consumers have to believe the system will be used in the future. When new hardware appears, and the installed base is low, the risk that the system will not be available in the future is high and this conditions hardware purchase decisions. A similar effect is evident when multiple languages are (potentially) in use. More popular languages have a reduced risk attached to their future use, and this sets up positive feedback effects on their adoption—consequently languages that are expected to be popular will be. Competition among languages is not unlike competition between network systems.

As Katz and Shapiro (1994) emphasize, competition among alternative network systems leads to three essential problems—expectations, coordination, and compatibility. Private and public institutions affect outcomes in a systems competition in each of these dimensions. The potential market failures in a network system is quite different than that which occurs in a pure communications network, and hinges on the distinction between the hardware and software of the system.

The *expectations* of both consumers and suppliers are important as the development of the system and the construction of its components is distributed over time. An individual for example choosing to learn a particular software language, or a seller choosing to produce a particular computer component such as a disk drive, must form expectations about the quality, reliability and extent of the rest of the system in the future. Once such investments are made they tend to be system specific.

The need for *coordination* on hardware choice is motivated by the presence of scale economies in the provision of the system software. A market failure can occur due to the linkage over time between the investment decisions on hardware, subsequent software development, and the feedback from one to the other. If average costs to users fall as the number of users adopting a specific piece of software rises, for example due to the large fixed costs of software development, then we would say there are economies of scale in the software provision stage. In this case it would be desirable if system purchasers could all ex ante agree on a single hardware type. The purchase of the hardware depends upon what software consumers think will become available. If there are economies of scale in the provision of the software, the ultimate availability of that software will depend upon what other consumers choose. This gives rise to positive feedback effects and the desirability for a coordination mechanism amongst consumers. Conventional market allocation mechanisms in which only prices are used to provide signals cannot solve the coordination problem in these circumstances. More direct mechanisms are necessary.

To get an efficient outcome overall requires a common set of expectations by both buyers and sellers, a coordination mechanism and ultimately, in the event of multiple systems, system compatibility amongst components. Obviously government regulation is one mechanism by which coordination can be achieved. But as emphasized in the network literature firms themselves often recognize the problem and form self-regulating industry or standards associations whose precise role is to perform the coordination function.

To what extent is the "hardware-software" paradigm of network systems theory relevant to languages? It is to this issue we now turn.

iii) Multiple Languages as Competing Network Systems

Language systems have many of the characteristics of the "hardware-software" paradigm in network systems described above, and competition between languages can be analyzed in a similar manner. In this instance the language, or more precisely the ability of individuals to use it, is the hardware of the language system. Individuals must make investments in learning a language; these investments once made are sunk costs, i.e. they are irreversible and highly durable. Their ultimate value depends upon the future availability of social and market institutions in which the language is useful—the institutions in this case are the "software" of the *language system*. As language is the basis for most communication almost any institution or activity which revolves around communication can be regarded as the software of the language system. This would include the social infrastructure such as the education system, the libraries, newspapers, television and radio, public and private signs, and so on. Many of these are linguistically specific. Individuals and firms give value to the system by either learning a language (investing in "hardware"), or contributing to the provision of "software". A free market in languages has all the characteristics of a network systems competition. In this instance free market outcomes need not be efficient. Specifically coordination on a particular language (the hardware) is necessary because of the economies of scale in the provision of the "software" side of a language system.[21]

---

[21] It is important to emphasize that the market failure occurs even in the absence of network externalities in the choice of language. The market failure will not occur if all software is provided under conditions of constant cost—in this case there are no downstream economic benefits to use of a single language.

Market structure in the "software" sector can affect also the outcome of the competition and conditions the necessary policy response to the "hardware-software" problem. The existence of scale economies in a particular software sector may be such that perfect competition cannot be sustained within that sector and an imperfect market structure is a more natural outcome. Suppose for example the book industry is monopolistically competitive—firms produce imperfect substitutes under conditions of decreasing cost, but any firm is free to enter (or leave) the industry. Books are quite obviously an important part of the "software" of a language system. With the free entry and exit of firms to the industry, books would be priced at average cost but above the marginal cost of production. Books are a good example where consumers value diversity in the range of goods offered. One policy response would be to offer a subsidy to the acquisition of a specific language which would increase the size of the "installed base" of a particular language group. In turn this would give rise to a greater variety of books published in that language as it would help to condition publishers expectations that a market for books in this language would exist. As in the usual analysis of monopolistic competition such a subsidy can be on balance welfare improving. A partial solution in this case is to use policy to coordinate expectations at the hardware end, even though the ultimate price-social cost divergence is in the software end.[22] If a subsidy were offered to book production price could be set equal to the social marginal cost of book production, but there is no guarantee the coordination problem on language would be solved—there might either be too many languages or too few.

Most of the devices available to firms to coordinate expectations in the case of systems competition, such as an industry standards association, are not available in the case of languages. Language adoption decisions are made by thousands of unrelated individuals and firms. The commitment of the state to provision of the necessary "social software" of the language systems can provide a focal point for expectations and thus coordinate individual investment decisions. This is an instance where the public sector may lead the private sector, and in so doing solve the coordination problem.

---

[22] Thus a first best, or fully efficient, outcome cannot be achieved by this policy alone.

One issue which arises under a regime of system competition is whether a component designed to work one system functions in another system—referred to as system compatibility. When people within a given geographic-economic region use different languages, this might be referred to as a case of systems compatibility failure. Bilingual systems are however precisely examples of overlapping language systems which offer a limited degree of compatibility. Both private and public institutions affect the degree of compatibility achieved and it is natural to inquire as to whether there is too little or too much compatibility.

Obviously the existence of bilinguals and translation services gives rise to a certain degree of compatibility.[23] The degree of compatibility is clearly however subject to choice, both by individuals and by governments. Defining compatibility in an analogous sense to the network literature is a bit difficult. In the case of face-to-face communication it might be literally defined as the ability of any two people to converse in the same language. This would imply that everyone is bilingual, or that there exist a lingua franca that everyone speak. In a pure communications network benefits arise from the consumption externalities that increased size brings, with "size" being determined by the degree of compatibility achieved. In the instance of competition between two language *systems* the benefits of compatibility arise from better scale economies on the software side—that is the same software can be used for both languages. An example would be public signs, for which the marginal cost of providing the same information in a second language is very low; i.e. most of the cost of the sign are fixed costs not associated with the actual labeling. Another example would be libraries, again whose costs are largely fixed costs. If libraries provide material in both languages (i.e. the software is compatible) this benefits users of both language systems.

The cost of compatibility depends upon the technological requirements necessary, and the mechanism by which compatibility is achieved. The network literature provides two broad methods by which compatibility is achieved between systems—i.e. make software components of the systems interchangeable. *Adapters* are technologies which make a component designed for one system functional on the other. *Standardization* is defined as a constraint on systems design such that all components are expressly designed to be interchangeable. Within language systems *translators* (either human or computerized) are analogous to adapters. The cost of compatibility can thus be measured by the cost of providing translation services and the degradation in the quality of communications which translation gives rise to. Standardization in a language system is analogous to the requirement that all software be compatible with both languages so that the ultimate communication services which language is used to produce do not depend upon the language used. In some cases the cost of standardization may not be high. Libraries once built can carry books in any language. In other situations standardization is either not feasible or very costly. If one thinks for example of electronic voice media—such as radio and television, or the printing of catalogues by retail stores—the services must actually be duplicated in both languages to give both language groups the same benefits.

---

[23] A formal model of translation with network effects is developed by Tamura (1996).

Now consider the possibility of a purely market-determined language outcome. With all software components privately provided there is no general guarantee that the market will provide the socially efficient degree of compatibility. The "tipping" phenomena, in which network scale gives rise to strong lock in effects, may result in multiple linguistically specialized services with a substantial degree of incompatibility. While this might be efficient for cost reasons the market structure effects of this scale and specialization may be negative. Monopoly or oligopoly in the supply of downstream language goods can produce an inefficient degree of bilingual service. This is particularly true if a firm providing a particular component can preserve market power, or protect its monopoly rents, by maintaining incompatibility with one of the languages. Markets might be segmented linguistically thus reducing demand elasticities and allowing prices to rise without attracting entry. From a social point of view the correct outcome may be to provide a bilingual (linguistic compatible) service, which would give rise to larger scale economies and thus lower marginal cost to both groups.

In modern economies language systems are rarely, if ever, the outcome of a free market mechanism. Because a language system involves the provision of software much of which is publicly provided, it is not really meaningful to speak of a purely market-based competition amongst languages and the theory must be amended to take this into account. Examples of language system software that are publicly provided include schools, libraries, printing of laws, traffic signs, and weather broadcasts. In many of these types of quasi-public goods there are economies of scale in production and thus the basic intertemporal coordination problem linking language choices to software provision exists. If governments supply bilingual public goods (software infrastructure) this would increase the likelihood of language compatibility in other privately provided parts of the system. It might in some cases be efficient to provide bilingual public software goods, even if ex post it appears that duplication of services is occurring. The reason is that the provision of such goods is in part a solution to coordinating expectations on future language use. The alternative, of providing only unilingual public goods, would lead to limited compatibility of the two languages, and possibly hasten the demise of the smaller of the two language systems.

In system markets the most conventional method for achieving compatibility of systems components would be for an industry standards group to decide on some form of standardization. In linguistic markets there is no good analogue to the "industry" whose commonality of interests is sufficiently well defined. Government may therefore have a role to play in providing a coordination function, either compulsory (as in the case of legislated solutions), or voluntary by promoting certain social conventions (such as bilingualism) in the provision of public services. The case for forcing linguistic compatibility of the overall language system, a fully comprehensive bilingual system, would seem to be particularly important where significant scale economies are possible in the provision of bilingual services. These must be weighed against the cost savings possible if similar services are provided in only one language or perhaps not at all to one linguistic group.

iv) Network View of Language and ICT Innovations

Summarizing, the main characteristics of the network externalities approach to language are:

- economies of size exist in the use of a single language which give rise to externalities in language choice decisions by individuals

- the hardware-software paradigm of network systems suggests that with economies of scale in the provision of activities or institutions which are language intensive there is a need for an expectations coordination on the language (or languages) to be used in the future.

The impact of ICT innovation within this framework is similar to that of the human capital approach but with the additional effects that follow from the presence of network effects. ICT increases the intensity and spatial scope of communication and thus increases the geographic span of the network externality in language use. The agglomeration and lock-in effects associated with these externalities are now extended geographically. The private return to use of the lingua franca increases and this raises the probability that the lingua franca will be used in any communication. With the positive feedback and lock in effects, as more people use the dominant language on a global scale local language use patterns change. Thus the initial pattern of language use will be upset by the ICT in favor of larger linguistic groupings spread over greater areas. An immediate policy implication is that provincial borders are less relevant to extent of the market for services provided in French than they were previously.

From the perspective of the hardware-software paradigm, ICT is itself a major new form of language systems "software", as it is a primary means of communication in which written and spoken language is used. In some aspects of ICT provision there are economies of scale which are dependent on the use of single language. Many examples could be given which hinge on the necessity of various components of the system to talk to one another. Standardization of communication protocols is necessary and this is greatly facilitated by the use of a single language. This is not unlike the requirement in international aviation that virtually all pilots and air traffic controllers use a single language which happens to be English. The existence of these economies might strengthen the case for coordinating on a single lingua franca outcome. On the other hand a great deal of ICT is not language specific—both hardware and software. E-mail programs can be easily adapted for use in any language; distance learning via ICT means that specialized courses can be made available to a much larger group and thus the scale economy restriction that otherwise forces language compatibility is reduced. In short it is possible that ICT rather than reinforcing single language outcomes actually reduces the significance of scale economies in the provision of language software. Thus the focus shifts to the possibility of greater competition between languages and use of multiple languages within single regional/ economic markets.

ICT also changes the role of some aspects of the provision of other language systems "software". Book publishing provides an important example. There are significant economies of scale of book publishing via traditional (pre ICT technology). The existence of these scale economies gives rise to the desirability for a single language coordinated outcome. ICT by reducing the fixed costs of setting type, editing and other aspects of publishing make shorter runs much more economical—that is economies of scale in publishing have been reduced by ICT. The impact of ICT on language and books is that with the reduction of the scale economies in book publishing the need for ex ante coordination on language is not as great. This simultaneously reduces the role for governments in attempting to coordinate on particular language outcomes, and increases the prospects for a multilingual publishing industry.

In summary the network point of view on language suggests that there are potential gains to social coordination mechanisms on language which markets cannot be expected to perform. As in the provision of public goods, the government may have a role to play in providing the lead in language market outcomes. This conclusion is complicated by the fact that the scope of the externalities may go beyond the borders of most national governments, and this problem is exacerbated with the widespread diffusion of Internet type networks.

3.3 Migration and Language Dynamics

Some more recent economic theories of language take a longer time perspective and emphasize the interaction between economic specialization, linguistic concentration, and the mobility of people on regional incomes and growth. Mobility of people in response to persistence income differences between regions is a general theme of the literature on regional economics. An important empirical observation has been that linguistic assimilation occurs much faster when linguistic groups become dispersed geographically[24]. Clearly the time horizons considered here are quite long—decades at least. While there are benefits to trade between regions there are also transactions costs imposed on that trade by linguistic differences between regions. If these costs are high enough and the linguistic groups are highly concentrated regionally it is possible that little trade between regions will result; the outcome is both geographic and linguistic isolation. In a review of the sociolinguistic literature on language use John and Yi (1996) identify a common pattern in the evolution of minority languages over time. There are three identifiable stages:

1. Two language groups co-exist geographically with limited economic interaction.
2. One group experiences a secular boom; industrialization would be an example.
3. The second language group assimilates into the economically larger group and few monolingual speakers of the second language remain.

It is argued that a number of cases fit this pattern including the Ainu in Japan, the Welsh in Britain and the Breton in France.

An economic model pertinent to this type of situation is provided by John and Yi (1996); with two regions and two languages. They assume that a common language is necessary for both trade and production. Individuals initially only know one language but can learn at a cost a second language in order to produce with others using that language. They also add a dynamic migration decision to the analysis by assuming that over time people may choose to move between regions if income differences are sufficiently large enough. With endogenous language learning there are some assumed economic benefits to both economic and linguistic agglomeration. Network externalities are assumed to exist both with language learning and with language use. An individual who speaks language A and moves to another region confers an external benefit on all speakers of A within the host region and a loss on all speakers of A in the source region. The theoretical prediction of this analysis is that complete assimilation of the smaller language group is more likely if the dominant language region is also the growing region, with immigration to the expanding region and adoption by immigrants of the dominant language. There are also partial-assimilation outcomes if both language groups are sufficiently similar in size. The gains to learning the other language in this case are sufficiently small while the cost is high. Production in this case occurs with linguistic specialization within each region. Full assimilation is less likely the higher the mobility costs and the more even the other (exogenous) determinants of economic growth across regions. In general the theory emphasizes the important role that migration plays in the longer term evolution of language use through its impact on language group size. Their analysis hinges on the presence of a positive feedback effect with the A language network externality, and the interaction with migration in response to economic opportunities which are specific to one region. To provide a benchmark, the theoretical prediction of their analysis with only one region, and therefore no migration opportunities, is full assimilation of the minority language due to the economies of scale the network externality introduces.

---

[24] John and Yi (1996) summarize this literature. See also Durkin (1996).

Immigration policy and regional migration therefore clearly will play an important role in the long term determinants of language use if this theory is correct. John and Yi also provide an explicit model of bilingualism in that they assume there is an initial group of individuals who can use both languages. This captures the important fact that languages are learned for a number of reasons other than economic—cultural, parental, educational and peer influences for example. In this instance they show that with initial bilinguals there is a possibility that monolingual coexistence can be sustained within the same region, as the bilinguals provide the necessary transaction services for interregional trade, and thus income growth can be sustained in both regions without migration.

They argue that Canada relative to the United States provide useful benchmarks on these alternative linguistic outcomes. In the United States immigrant minority language groups are assimilated with internal migration between regions of the U.S. contributing to the speed of the assimilation process. In Canada they argue that French versus English is increasingly based on geography, resulting in linguistic isolation of the two groups.

i) Mobility and ICT

Over the longer term trade in goods between regions and the movement of people are substitutes. The geographic pattern of language use and other location specific factors provide a great deal of inertia in individuals' location decisions. ICT technology by promoting virtual mobility of labour services reduces the cost of trading, relative to the costs of migration. This has some fairly predictable consequences for the interaction of language use and learning with migration.

a) The benefits to migrating from a region in which one's native language is not used extensively to a region in which the language is used extensively may be reduced due to the consumption benefits conferred by virtue of the creation of larger virtual networks of specific language users. This would tend to result in greater persistence in location decisions and thus a tendency to lock-in the historical geographic distribution of language users when the new technology is introduced.

b) The benefits to migration for purposes of participating in an economic boom may be reduced by the availability of ICT technology. This will be particularly true for those who are involved in the production of goods and services which are in demand by the region experiencing the boom. Integration of production across space by use of ICT has the potential effect of transferring an initial boom in one region to similar producers in other regions. This will reduce the flow of migrants that might otherwise occur for reasons of employment, but to increase the amount of language learning necessary for international production. To the extent these migrants would have been part of a linguistic minority this would reduce the rate of assimilation of the minority language.

4. LANGUAGE AND THE INTERNATIONAL ECONOMY

4.1 Introduction: Language and International Transactions

Language has economic impact through its effect on the nature and cost of transactions between the domestic economy and the broader international economy. For Canada, one of the most open of the industrialized countries in the world, with an export to gross domestic product (GDP) ratio of close to 40%, the implications of language for its international competitiveness is a matter of considerable economic significance. For most of the 1990's virtually all of Canada's economic growth has been a consequence of growth in international exports.[25] Furthermore the highest productivity growth sectors have been those involved in international transactions. The official national policy of bilingualism is often cited as imposing additional costs on doing business both within and with Canada relative to other countries. However a true cost-benefit analysis of bilingualism would be seriously incomplete without a broader analysis of its impact on international competitiveness of Canadian business. In this section the implications of language choice, use and policy for international trade in goods and services is analyzed. As noted in section 2 the developments in ICT are regarded as an important driver of the globalization of the world economy. This section also looks at how ICT impacts on the globalization process and how it interacts with language. Clearly the shrinking of time and space that these technologies induce is likely to have a profound impact on a range of international transactions, the way language is used in such transactions, and thus the linguistic characteristics of a highly open economy such as Canada.

International transactions occurs in a wide range of markets for goods and services, in transactions involving the exchange of factors such as capital and technology and finance, and in the relationships among divisions of international and global firms. First, the conceptualization of language in international transactions is reviewed as a prelude to a discussion of its role in international transactions. The next four subsections review the dominant theories of the determinants of international trade, in each case with an emphasis on the role that language is likely to play and how the change in communications technologies will affect the use of language. Each of these draws on the economic theories of language discussed in section 3.

---

[25] These developments through 1994 are summarized in Department of Foreign Affairs and International Trade (1995). More recent data show those trends remain intact.

4.2 Language as an Operating Cost or an Input

In the conceptualization of the effect of language on international transactions there are two possible alternative analytical paradigms which might be used. The first, introduced by Breton and Mieszkowski (1979), treats "language" as a transaction cost in trade between regions or nations. In that framework a reduction in transaction costs which occurs say due to a trade specialist learning a second language is thought of as analogous to a transactions cost reducing technological innovation. This framework can be generalized to the concept of language abilities as an input to the production of a service, "communication services", which are used in the process of exchange. In conjunction with changes in the communications technology this framework allows one to consider the costs of providing transaction services, and how changes in the structure of these costs will affect the pattern of international transactions.

A second conceptual approach, is to think of "language" as embodied in the input structure of various goods and services which are involved in international transactions analogous to the concept of factor intensity familiar from the Hecksher-Ohlin model of trade. The concept is useful only to the extent that one can meaningfully speak of more and less language intensive goods and services. Generally we might think of complex goods and services, typical of the knowledge economy, as more intensive in their language requirements than say steel or shoes. In this latter framework shifts in the supply and productivity of language intensive factors will impact on the pattern of international specialization. In the case of multiple languages one would need to specify a set language intensities for each good. The theory derives much of its power when one links the supply of various languages as embodied in the human capital stocks of an economy or region to the goods and services produced using those factors of production.

Both of these approaches are useful in attempting to provide a framework for the analysis of international exchange which incorporates language as an essential element.

4.3 Homogeneous Goods and Services

A great deal of international trade is driven by differences among nations in levels of productivity or differing relative endowments of factors of production.[26] The neoclassical trade models all emphasized these features in the demonstration of the law of comparative advantage. The theory assumed that all goods are internationally homogeneous—that is goods do not differ in any relevant characteristic no matter where they might be produced. A shoe produced in France is the same as a shoe produced in Canada. Realistically one needs to account within this theory for the cost of international trade versus intra-national trade. While often ignored in classroom theory it is evident that the transaction services required for international trade are significant. Communication is an essential requirement in the provision of transaction services, and therefore a (common) language is a necessary input for the provision of these services. In addition the goods themselves often have a "language content" in the form of labeling, instructions for use and so on. The theory can be simplified if it is assumed that consumers do not view goods provided in different languages as different goods, provided the language content requirement of a good is delivered in the native language of the consumer. Think of the typical set of instructions and labeling attached to a modern consumer durable. The informational content of these instructions are the same no matter what language is used, but sellers must provide these in the language which consumers use. Different goods however differ in their communication intensity requirements—the instructions for a computer are a great deal more complex than for pair of shoes.

The basic implication of this theory can be illustrated for the case in which internationally there is a lingua franca used generally in the supply of international communication services. If a region or nation with a monolingual minority language is to participate in the international economy they must either invest in the skills necessary to provide communication services or purchase them on the international market. The extent of international trade as opposed to intra-national trade is determined by the level of these costs, relative to the benefits available to the nation through trade. The theory has a number of interesting implications:

---

[26] I assume here some familiarity with the textbook discussion of trade and comparative advantage. See any economics principles text.

1. The higher the language learning costs for a lingua franca the less extensive will international trade be as a share of total eonomic activity, and the more likely a language intensive service or good will be produced domestically. That is linguistic isolation can occur and be consistent with (rational and efficient) international economic isolation.
2. A minority language region or nation is likely to export among language intensive goods only those goods and services which use the abundant minority language; i.e. Quebec should export French intensive language goods. All other language intensive goods will be imported and make use of the lingua franca.
3. For a small region facing a given terms of trade, free trade is the optimal policy. Attempts to protect language intensive, import competing goods and services will raise the returns to the factors intensive in the production of such goods, but will reduce the aggregate real income of the region.[27]

4.4 Discriminatory Goods and Services

In the case of many goods and services the concept of an internationally homogenous commodity is not a satisfactory assumption. Goods and services are naturally differentiated in their characteristics, both across countries and across firms. The market structure which supports such industries is either monopolistically competitive or oligopolistic. In the case of language intensive goods and services differentiation is even more likely where customer service and product complexity is an essential characteristic of the market. When consumers value product differentiation a small open economy benefits from the additional welfare gains to variety that international trade allows. By specializing in the production of a few goods and importing others its' consumers are much better off than were it to produce a limited range of products for a small market. In international markets where differentiation is critical, transaction service requirements will be high and be an important part of the overall cost structure. Most of what has been said regarding language and transaction services for homogeneous goods is valid in product differentiated industries as well. An important exception is in those circumstances in which the cost structure of the sector is such that transaction services are in the nature of a fixed cost rather than a variable cost. In a number of instances this seems like a realistic assumption. If the act of "going global" for a firm involves setting up a marketing network or distribution system all of whose costs are sunk this would be just such a case. As discussed in Harris (1995a) if the communication network costs are a large part of the cost then there is an element of natural monopoly in the social provision of communication services. Additional users of the network can be added at lower average cost due to the sharing of overall system costs. On the other hand at the individual firm level the network cost represents to the firm a fixed cost rather than a marginal cost of output. Technological change in communications which reduces these costs results in a growth in the volume of differentiated trade between physically isolated regions.[28]

---

[27] It is important to note there are no language network externalities in the Hechscher-Ohlin model and this is in part the basis for the proposition that free trade is the optimal policy. I will not pursue here the interesting question of (second best) trade policy interventions in response to a failure in language markets.

Language figures prominently in product differentiated trade in two ways. As an essential character of the good itself, and as an input to transaction services. Consider each in turn.

Unlike the assumption made in the last section, an essential aspect of differentiation in the minds of the consumer will be the language in which the good/or service is "packaged". As noted many so called global markets are subject to a process of localization—the good is customized for the local market, given the distribution system, the language used and other relevant cultural attributes necessary to sell locally. Such goods are generally differentiated in the minds of the consumer from the generic global equivalent. To the extent that this localization effect is strong it will give rise in the case of global goods to demands for bilinguals to facilitate the localization process. On the other hand there will be many goods which may be local, and linguistically differentiated, but which have a potentially larger external market. If Quebec can sell "French" intensive services in other French speaking regions then the process of communication cost reductions should enhance the size of the market for French intensive goods. The pattern of trade can therefore shift in response to reductions in communications costs toward the exchange of differentiated products among other French speaking regions. While "regional" economic integration is the most common form of economic integration we are familiar with, the new communications technologies may facilitate a form of *virtual economic integration* among regions and countries using the same language. International exchange among these regions would be more naturally based on product (both goods and services) differentiated trade rather than trade due to comparative advantage, given that most homogeneous goods have less inherent language content to them.

---

[28] The model is subject however to multiple equilibrium with the economy in some cases choosing to use a mix of local and global goods, while from a welfare point of view all goods should be produced globally. There are no elements of comparative advantage in the model which would otherwise constrain this strong push towards globalization as communication costs fall.

Reductions in communications costs may constitute a reduction in the fixed costs to trade, and thus tend to lead to a greater variety of products produced rather than an increase in the volume of any single variety. Within a given geographic market as these costs fall the scale of any individual firm will tend to fall, although the scale of the entire industry will typically rise.[29] As the firm enters new foreign markets its size will increase as the fixed costs of communication are spread across many national markets simultaneously. The market expansion effect of reduced communication costs does increases the pressure to adopt a lingua franca within the firm, unless that expansion can be entirely accomodated through entry to linguistically similar markets. It is probable however that in many industries other factors, such as geographic proximity, may figure more prominently in explaining the pattern of entry to new markets than the language used in those markets.

The impact of reductions in communications costs on a small region which is initially linguistically isolated could be considerable. Prior to the availability of an international network differentiated goods are produced for the local market. Exports and imports tend to be concentrated in standardized products with language services provided by foreigners and the few local specialists needed to manage such trade. The change in communications technology allows access to the global economy with local firms producing differentiated products for export. This would require the bulk of transaction services for exports be done in the lingua franca. If localization of imported varieties were an important prerequisite to local sales then imports would give rise to demand for bilinguals to facilitate localization. As ICT reduces the fixed cost of localizing international products the extent of product variety increases in the economy. In either case the economy has been pushed to either a bilingual or a unilingual lingua franca working mode.

---

[29] This is a standard prediction of the monopolistic competition model of international trade. See Helpman and Krugman (1984).

In a related model of the impact of communications on trade Harris (1997) considers the impact of the new communications technology on the implied trade in services, and demand for skilled relative to unskilled labour. That model emphasizes that the Internet (as a generic form of ICT network) makes possible international trade in knowledge intensive business services requiring the interchange of information among parties, to occur across space rather than be mediated on a face to face basis. Internet services are assumed to be produced using the services of skilled labour. As the extent of the business services market increases, aggregate productivity levels increase due to the benefits of greater specialization and division of labour. A main point of the theory is that virtual international integration of business service markets can be achieved through Internet technology. Prior to the wide scale availability of this technology business services are primarily non-traded or subject to very high costs of transport. The firm purchasing many such services has to be physically proximate to the sellers due to the intensity and repeated nature of the interactions required—imagine an architect for example working with a client to design a building. After the introduction of ICT real time intensive interaction between the sellers and buyers of business services is possible across large distances.

This virtual market integration will have a considerable effect on wages to skilled and unskilled labour. The basic prediction of the theory is that wages to skilled labour rise in the integrating networked regions, and in fact are equal, after virtual integration. In the case of a small and large economy integrating the wage increase is largest in the smaller economy. This theory suggests that smaller economies (the "periphery" in development language) benefits the most from the communication network.

It is possible to apply this model to the language question as done previously. Assume that the lingua franca is the only means of selling highly differentiated services in the larger market, and furthermore is necessary for those supplying Internet services. A virtual integration of the service markets would require that minority speaking unilinguals in the service industry learn the lingua franca. The wage to skilled labour while equal after virtual integration in both regions, would have to be sufficient to justify the cost of those learning the lingua franca in the minority language region. However because of the positive productivity effect due to the increased specialization of labour there is a social return to integration which exceeds the expected private returns, even after counting the costs of language learning. In this case there is a positive spillover from private language acquisition decisions to increased trade and specialization in business services to higher aggregate income levels. However as in many theories with spillover effects it is possible the economy can become stuck at an equilibrium with "too little" language learning.

4.5 International Spill-over Effect of Knowledge: A Source of External Scale Economies

An important determinant of international trade are scale economies which are external to the firm. Generally these result from the provision of specialized services and supplier skills in a geographically concentrated area. Silicon valley is one well cited example. External scale economies are also often the source of agglomeration of economic activity. It is important to distinguish between external economies for which geographic proximity is a necessary ingredient from those for which it is not. The existence of these effects give rise to an economies of scale phenomena. As the scale of activity of the industry rises the improvements in productivity give rise to decreased costs to all firms in the industry. These effects are external because no single firm takes into account the benefit it confers upon other firms in the form of increased productivity, when it increases its own output. Markets characterized by external scale economies are generally thought of as having a competitive market structure. Concentration of sellers is not an important feature of this analysis. An important characteristic of markets subject to external scale economies is that generally the level of output is less than that which is socially efficient, and market price which equals the average cost of production in that sector is above the marginal social cost of an increase in industry output.

When applied to international trade there are generally two important characteristics of trade in industries subject to external scale economies. The theory's prediction depends upon whether one views the extent of the spillovers responsible for the scale effects as contained at the regional, national or international level.[30] Scale economies at the international level confer a benefit upon all economies and do not bias the trade pattern in any particular respect; in this case we would expect trade patterns to be effected at the margin by other factors such as comparative advantage. Economies of scale at the national level do however have a significant effect on the pattern of trade. Specialization will tend to occur, in the absence of comparative advantage effects, as one region achieves lower costs by concentrating the world's production of this activity in a particular geographic location. Following Ethier (1979) it also known that larger countries are more likely to be the location of such industries and the beneficiaries in the form of higher incomes. The smaller countries tend to import these goods and benefit only as consumers, not producers.

Introducing language into such models is potentially very interesting. Language as a transaction service both within and between firms is an important conduit by which these spillovers are transmitted from one firm to another, or more accurately from one individual to another. In today's knowledge intensive economy it is argued that most examples of external economies have as their origin some type of knowledge spillover.[31] Consider the case of knowledge transfers between individuals within a given national economy which give rise to external scale economies at the regional/national level. Because these effects are external to firms there is no explicit compensation for the transfer of such knowledge. Now suppose in addition the transfer of knowledge depends to some degree on the efficiency of communication. In the case of a region populated by two linguistic groups a natural question is how the language situation affects the process of information exchange upon which these external economies hinge. If the size of the two linguistic groups is fixed, and there is no communication between them, then costs in the industry would be higher than if the industry were linguistically integrated due to the implied reduction in intra-national knowledge transfers. In this case there is a double market failure in that output of the industry as a whole is too low, and communication between the unilingual groups is too low. If communication is facilitated by one linguistic group learning the other's language and sufficient interchange among the firms occurs this would remove one of the two inefficiencies—that one due to linguistic specialization.[32]

---

[30] See Ethier (1979) (1982) for a discussion of national versus international external returns.

[31] For a review of this argument see Howitt (1996).

Now imagine the case in which the information transfers are potentially international in scope but require a common language to be realized. Consider the example of one region (Quebec) that operates in French while most international knowledge is routinely transferred among specialists in the lingua franca (English) in another region, the United States. The standard model of international trade with external economies would in these circumstances predict a pattern of trade in which Quebec specialized and exports goods not subject to knowledge transfers, and imports from the United States those goods subject to external economies. Subsidies within Quebec to learning English would facilitate the transfer of knowledge from the United States to Quebec raising productivity within Quebec.

Language in this instance is assumed to be the vehicle for the transfer of knowledge, for which the firm is a beneficiary of in the form of higher productivity.[33] It is commonly argued that firms are indeed well aware of such spillovers in these type of industries and at least in part the externality is internalized by conscious devotion of resources to facilitating the transfer of information. In some cases this can occur by outright theft, and in other instances by hiring away the competition's best people. To the extent such knowledge processes are internalized, firms will be willing to pay higher wages to those possessing the necessary skills, including a return to the international language. In a sense we are back at least in part to the Breton-Mieszkowski analysis and as they suggest the returns will be higher to the minority group learning the majority language.

---

[32] This is a an application of the model of international integration in the presence of knowledge spillovers due to Romer and Rivera-Batriz (1991) who extend Ethier (1982) to a dynamic setting

[33] In the longer run most of these productivity gains are captured by workers in the form of higher wages.

Let us now add the realistic and important factor which is that an English speaking Canada that trades a great deal with Quebec. By virtue of proximity, national institutions, and other factors there is a much larger volume of trade between firms in English Canada and Quebec than between Quebec and the United States.[34] As a result we would expect to see some knowledge intensive economic activity occur in Quebec that arises from the spillovers from English Canada. Enhancing these knowledge transfers by increasing the number of bilinguals in both Quebec and English Canada who are employed in the knowledge intensive sector would raise productivity in both regions. If one adds to this the assumption that English Canada, due to its common language and border with the United States, benefits in the first instance to a larger degree from international knowledge spillovers than does Quebec, then firms within English Canada may provide a conduit by which knowledge generated in the United States is transferred to Quebec. Bilinguals working in Quebec-English Canada firms provide the links by which these transfers are facilitated.

i) ICT Technology and Knowledge Spillovers

The important international dimension of ICT technology in the presence of potential knowledge spillovers is that it increases the *speed and magnitude* of such spillovers. The Internet provides a means by which such specialists can interact more efficiently across distances which transcend national boundaries. This enhances the speed and efficiency with which knowledge spillovers occur. If one thinks of external economies as depending traditionally upon two factors—knowledge spillovers and geographic proximity—then ICT technology clearly reduces the necessity of geographic proximity for some knowledge transfers to occur.

One can imagine a situation in which the constraining barrier to international transfers of knowledge are communication barriers. The situation of a small linguistically isolated region might adequately be described by the existence of national scale economies in some sectors, but without access to international spillovers. Its economic structure under free trade would most likely be a specialization in those industries not subject to scale economies.[35] Introduction of access to a global Internet in this instance will raise the social returns to acquisition of the lingua franca, lead to cross border knowledge spillovers, and increase the output of knowledge intensive industries. As a smaller region in a large global economy it will benefit relatively more from the inward international flows of knowledge, rather than the outward flows. For this shift in economic structure to occur it is necessary that a sufficient number of individuals interact with the international "knowledge based" economy. Market wages to bilinguals versus unilinguals will not initially reflect the social returns to investing in the lingua franca, due to the external nature of the knowledge spillover. Subsidies or other more direct interventions to increase the supply of bilinguals may be an appropriate policy response.

---

[34] See McCallum (1995).

4.6 The Global Structure of Business

A fact of the global economy is that large multinationals are responsible for an increasing share of world trade, and a great deal of the international exchange of goods and services constitutes intra-firm transactions. While estimates vary, as much as 50 percent of Canadian imports are attributed to intra-firm transactions. Consequently the way in which firms organize themselves internationally is an important determinant of international competitiveness. The traditional theory of the multinational firm argues that with firm specific advantages they will organize transactions internally rather than engage in arm's length international market transactions when it is cost efficient for them to do so. The source of these efficiencies are firm specific assets, including experience, market goodwill, advertising, R&D expertise, and so forth. Clearly communication within the firm versus external to the firm is one aspect of organizational cost which determines the margin at which an activity is internalized. The globalization of enterprise has been closely related to the ICT revolution. As argued in section 2 ICT has allowed international firms to increase their span of control, and to exploit global comparative advantages in ways that were, until recently, infeasible. Some business theorists have argued the contrary point of view, which is that the ICT revolution has made possible greater use of market coordination mechanisms, and a substitution of contracting-out for made-in-house. The idea is that ICT allows networks of component and service providers to function effectively with increased use of just-in-time inventory systems in conjunction with flexible manufacturing technology. A good example of such a network of firms is the textile industry of northern Italy. A fair assessment would be that ICT is having as yet unpredictable consequences for the organizational structure of firms, but whatever the outcome borders will matter less.

---

[35] This is the Ethier (1979) result—the large country under free trade is the one that produces the good subject to national scale economies.

Firms must make conscious decisions as to the language in which day-to-day intra-firm operations occur.[36] If globalization and ICT is giving rise to ever larger global firms there seems a straightforward case to be made that within such firms at the management level use of a lingua franca will dominate. The global managerial class will therefore be increasingly bilingual with one of the languages being English. The smaller economies will participate to an increasing degree in the international economy under this view, as recipients of direct investment by large global firms. These economies will serve as production platforms, provide localization services and some of its citizens will occupy managerial positions.

Dunning (1996) however argues that this view is premature and that most firms engaged in international trade would be more accurately described as *regionally based firms* with the basis of operation being one of the continents. Regional (i.e. continental) firms will tend to work in the dominant languages of their respective regions. In the case of Europe this will give rise to greater linguistic conflict within organizations, and increase demands for multilinguals in managerial positions. The Canadian situation is interesting in that North American based firms would tend to work in English, and thus native French speakers must learn English if they are to function at the highest levels. In that respect the situation seems to have changed little from the 1960's.

---

[36] See footnote 12 op.cit.

The Dunning picture of international business is based on early 1990's data and the situation is evidently fluid. North American firms are increasingly seeking a presence in Asia and South America for example. European firms continue to invest in North American and Asia. Globalization of business seems to be occurring. While globalization will increase the use of a lingua franca, the pressures of localization will give rise to increased organizational demands for multilingual managers and to language training. As a bilingual country Canada has a great deal of experience in these matters and may therefore have a competitive advantage in the provision of multilingual managerial services. This aspect of the competitiveness of Canadian management is enhanced by the relative inexperience of U.S. firms with multilingual organizations. In this case it seems possible that as North American corporations go global, increased demands for multilingual language capability may turn out to be an important source of Canadian competitive advantage.

5. BILINGUALISM AS PUBLIC POLICY

What are the implications of the new communications technology for the policy of official bilingualism in Canada? The theories of language and international exchange discussed above all suggest that there are two strong forces at work in the global economy as a result of the dramatic innovations in ICT over the last decade or more.

- Increased economic integration across the globe with increased volumes of trade in goods and business services, and the emergence of truly global firms.
- The existence of strong network externalities in communication which spill on to the use of language and contribute to forces leading to increased use of the world lingua franca, English.

Canadian language policies have been geared toward fostering the development of a French-English bilingual federal state. The reality is that these polices have been only partially successful, but the widespread popularity of French immersion programs suggests it is a policy with considerable public support.

Globalization and localization create obvious problems for bilingual federations such as Canada. As a smaller nation state globalization reduces the economic power of the federal government, including the power to influence its citizens towards learning French. If English is emerging as the sole lingua franca of the global economy then English speaking Canadians perceive little economic benefit to becoming bilingual in French-English. Given that Quebec constitutes a well defined linguistic and geographic region within Canada, enhanced localization increases the relative political and economic importance of the province of Quebec, and as the natural defender of the local language of that region. It is not surprising that in such a world there are those who wish to increase the political powers of the regions (provinces) as politics follows economics.

To the extent that a large part of the Canadian population works in and speaks English the current trends in technology and globalization carry no particular threat at least from the perspective of language. The basic issue is whether or not the use of French will decline or not in the face of the above trends, and in light of that the economic benefits of a policy geared towards increasing the number of French-English bilinguals in Canada.

I believe there are three good arguments suggested by the previous analysis to suggest that the new communications technologies enhance the economic value of official bilingualism and that the pessimism expressed in some quarters on the future benefits of bilingualism is unwarranted.

First, while the economy is globalizing, there is also increased localization which increases the demand for second language use. A sizable Francophonie gives rise to French linguistic demands for localization purposes. Bilingual Canadians are well placed, particularly from the perspective of North American business, to provide those type of localization services. They can do this as either employees of global firms or as employees of specialized service providers.

Second, technologies such as the Internet are increasing the size of virtual linguistic groups around the world by providing links were previously none existed. In particular both within Canada and more generally around the world the new technology allows for virtual integration of French speaking individuals. The existence of this now much larger and more closely integrated Francophonie creates opportunities for economic exchange in language intensive services that were previously not possible. Thus we can imagine for example that Canada could develop export industries in advertising, entertainment services, publishing, web page development, medical diagnosis, consulting, and a wide range of services in French and the technology of service delivery was the Internet. The liberalization of world trade in services which has been ongoing for the last decade will help to facilitate the development of these export service industries.

Third, the Internet may actually lead to greater linguistic diversity rather than less in the global economy. The long term dynamics of language use are difficult to predict. Certainly while the emergence of English as the world lingua franca seems to be the current trend, one cannot discount the other possible scenario—one of which is that the globe converges on the use of a few dominant languages for the purposes of economic exchange. Mandarin for example may become widely use in Asia, Spanish in the Americas and so on. Given that this is a realistic possibility bilingualism contributes to international competitiveness because it enhances the ability of firms and individuals to work in other languages, and enhances the capacity to learning additional languages. A bilingual labour force therefore creates a better base with which to compete in a multilingual world.

A final point on bilingualism concerns the consistency of language policy with other aspects of economic policy. Canada has, and continues to follow, a fundamentally liberal and open policy towards the international economy. It is a strong supporter of the World Trade Organization (WTO), is economically integrated with the other North American economies through the NAFTA agreement, and is promoting liberalized trade and investment in the Asia-Pacific via participation and leadership in APEC. Certainly a fundamental aspect of interacting with other nations, both for cultural and economic purposes is in the use of language. A bilingual policy is a clear signal to other nations that Canada is open to linguistic diversity. This openness should be of fundamental value as Canadian bureaucrats, politicians and business people seek to establish closer economic ties with the developing non-English speaking economies in East Europe, Asia and Africa and South America. This value is evident when one considers that in many of these newer markets Canadian business competes head-to-head with U.S. firms, who do not share this characteristic.

6. CONCLUSION

This paper has examined the effect of the dramatic developments in information and communications technology, and the emergence of global electronic networks such as the Internet on the economics of language use. The basic economic theories of language were re-visited in light of these developments. While many of the basic insights of the human capital approach to language remain valid in light of this technology, it is clear that the international patterns of language use will be fundamentally altered. There is a significant possibility that the network scale effects present in the use of these communication technologies, together with global economic integration will push the world to a single lingua franca, most probably English. However the technology by increasing the size of virtually integrated linguistic groups also has the possibility of allowing for the increased use of few dominant languages one of which may be French.

The paper discussed the implications of these developments for the Canadian economy in the broader global context. As an open economy and one heavily dependent on trade for growth, income and jobs promoting international competitiveness is essential. The role of language in international trade was discussed in light of the ICT developments and globalization. It was argued that French-English bilingualism may increase the international competitiveness of Canadian citizens and firms, and furthermore that opportunities exist for developing new French language intensive business service exports as a consequence of Internet technology. For these reasons bilingualism as public policy fits naturally with Canada's traditional liberal posture toward openness in trade policy.

BIBLIOGRAPHY

Abler, R.F. and T. Falk. "Public Information Services and the Changing Role of Distance in Human Affairs". *Economic Geography*, Vol. 57, No. 1, 1981.

Ambrose, J.E. and C.H. Williams. "On the Spatial Definition of 'Minority': Scale as an Influence on the Geolinguistic Analysis of Welsh", in E. Haugen *et al* (eds.) *Minority Languages Today*. Edinburgh: Edinburgh University Press, 1981.

Breton, A. "The Economics of Nationalism". *Journal of Political Economy* 62, 1964, 376–86.

Breton, A. "Nationalism and language policies". *Canadian Journal of Economics* 11, 1978, 656–68.

Breton, A. and P. Mieszkowski. "The Economics of Bilingualism", in W.E. Oats (ed.) *The Political Economy of Fiscal Federalism*. Lexington: Lexington Books, 1979.

Breton, A. "The Economics of Language". Toronto: Department of Economics, University of Toronto, 1997 (mimeo).

Carr, J. "Le bilinguisme au Canada : l'usage consacre-t-il l'anglais monopole naturel?", in F. Vaillancourt (ed.) (1985) *Économie et langue*. Montreal: Editeur officiel du Québec, 1976.

Chiswick, B. and P. Miller. "Earnings in Canada: The Roles of Immigrant Generation, French Ethnicity and Language", in T. Paul Schultz (ed.) *Research in Population Economics*. Greenwich, CT: JIA, 1988.

Chiswick, B. and P. Miller. "Language in the Immigrant Labor Market", in B. Chiswick (ed.) *Immigration, Language and Ethnicity: Canada and the United States*. Washington, DC: API Press, 1992.

Chiswick, B. "The Endogeneity Between Language and Earnings: International Analyses". *Journal of Labor Economics*, Vol. 13, No. 2, 1995, 245–287.

Church J. and I. King. “Bilingualism and Network Externailities”. *Canadian Journal of Economics*, Vol. 26, No. 2, 1993, 337–345.

Coulmas, F. *Language and Economy*. Oxford: Basil Blackwell, 1992.

Crystal, David. *The Cambridge Encyclopaedia of the English Language*. Cambridge University Press, 1995.

Department of Canadian Heritage. *New Canadian Perspectives: Official Languages and the Economy*. Ottawa: Minister of Public Works and Government Services, 1997.

Department of Foreign Affairs and International Trade. “Changing Partners: Trends in Canada’s Regional Economic Relations”. Ottawa: Policy Staff Paper, 1995.

Dunning, J.H. *Global Business*. Oxford: Oxford University Press, 1996.

Durkin, J. “Immigration, Assimilation, and Growth”. Manuscript. Wayne State University, 1996.

Economides, N. “The Economics of Networks”. *International Journal of Industrial Organization*, Vol. 14, No. 2, 1996.

Emmans, Keith, Eric Hawkins and Adam Westoby. *The Use of Foreign Languages in the Private Sector of Industry and Commerce*. North York: Language Teaching Centre, University of York, 1974.

Ethier, W. “Internationally Decreasing Costs and World Trade”. *Journal of International Economics* 9, 1979, 1–24.

Ethier, W. “National and International Returns to Scale in the Modern Theory of International Trade”. *American Economic Review* 72, 1982, 389–405.

Fishman, J. *Sociolinguistics: A Brief Introduction*. Rowley, MA: Newbury House, 1972.

Fixman, Carol S. "The Foreign Language Needs of U.S.-Based Corporations". *Annuals of the American Academy* 511, September 1990, 99–122.

Freudenstein, Reinhold. "Teaching and Learning Foreign Languages in Industry and Commerce", in Reinhold (ed.) *Language Incorporated: Teaching Foreign Languages in Industry.*

Freudenstein, Jurgen Beneke and Helmut Ponisch. Oxford: Pergamon Press, 1981.

Garcia, Ofelia and Ricardo Otheguy. "The Value of Speaking a LOTE in U.S. Business". *Annuals of the American Academy* 532, March 1994, 99–122.

Globerman, S. "The Information Highway and the Economy", in P. Howitt (ed.) *The Implicatioins of Knowledge-Based Growth for Micro Economic Policies*. Calgary: Univeristy of Calgary Press, 1996.

Grenier, G. *Language as Human Capital. Theoretical Framework and Application to Spanish Speaking Americans.* PhD dissertation. Princeton: Princeton University, 1982.

Grenier, G. "An Economic Perspective on Learning a Second Language". *Journal of Multilingual and Multicultural Development*, Vol. 4, No. 6, 1983, 471–483.

Grin, F. *L'impact de l'efficacité personnelle sur l'allocation du temps.* PhD dissertation. Geneva: Universite de Geneve, 1989.

Grin, F. "The Economic Approach to Minority Languages". *Journal of Multilingual and Multicultural Development* 11, 1990, 153–175.

Grin, F. "The Economics of Language: Survey, Assessment and Prospects". *International Journal of Sociology of Language* 121, 1996, 17–44.

Harris, R.G. "Communications Costs and Trade". *Canadian Journal of Economics*, 1995a, S46–S75 (special issue).

Harris, R.G. "Globalization: A Critical Survey". Ottawa: Report for the Senate Committee on Foreign Affairs, 1995b.

Harris, R.G. "The Internet as a GPT: Factor Market Implicattions", forthcoming in E. Helpman (ed.) *General Purpose Technologies*. Cambridge: M.I.T. Press, 1997.

Hocevar, T. "Equilibria in Linguistic Minority Markets". *Kyklos* 28, 1975, 337–57.

Helpman, E. and P. Krugman. *Imperfect Competition and International Trade*. Cambridge: M.I.T. Press, 1985.

Howitt, P. "On Some Problems in Measuring Knowledge Based Growth", in P. Howitt (ed.) *The Implications of Knowledge-Based Growth for Micro-Economic Policies*. Industry Canada Research Series. Calgary: University of Calgary Press, 1996.

Innis, H.A. *The Bias of Communication*. Toronto: Univeristy of Toronto Press, 1950.

John, Andrew and Kei-Mu Yi. "Language, Learning, and Location". Working paper. Houston: Department of Economics, Rice University, 1996.

Katz, M. and C. Shapiro. "Systems Competition and Network Effects". *Journal of Economic Pespectives*, Vol. 8, No. 2 (Spring 1994), 93–116.

Katz, M. and C. Shapiro. "Technology Adoption in the Presence of Network Externalities". *Journal of Political Economy*, Vol. 94, No. 4, 1986, 822–841.

Laitin, D.D. "The Tower of Babel as a Coordination Game: Political Linguistics in Ghana". *American Political Science Review*, Vol. 88, No. 3, 1994, 622–634.

Lipsey, R. G. *Economic Growth, Technological Change, and Canadian Economic Policy*. C.D. Howe 1996 Benefactors Lecture. Toronto: C. D. Howe Institute, 1996.

"Market Access in International Trade: A Theoretical Appraisal", in R. Stern (ed.) *U.S. Canadian Trade and Investment Relations with Japan.* Chicago: University of Chicago Press, 1991.

Marshak, J. "Economics of Language". *Behavioral Science* 10, 1965, 135–40.

McCallum, J. "National Borders Matter: Canada-U.S. Regional Trade Patterns". *American Economic Review* 90(2), 1995, 92–96.

Migue, J.L. "Le nationalisme, l'unité nationale et la théorie économique de l'information". *Revue canadienne d'économique* 3, 1970, 183–88.

Pelletier, Gerard. "Francophonie". *The Canadian Encyclopedia Vol. II.* Edmonton: Hurtig Publishers, 1985.

Raynauld, A. and G. Marion. "Une analyse économique de la disparité inter-ethnique des revenus". *Revue économique* 23, 1972, 1–19.

Reeves, Nigel B.R. "The Foreign Language Needs of U.K.-Based Corporations". *Annuals of the American Academy* 511, September 1990, 63–70.

Rivera-Baitz, L.A. and P. Romer. "Economic Integration and Endogenous Growth". *Quarterly Journal of Economics* 106, 1991, 531–56.

Shipman, Alan. "Talking the Same Languages". *International Management*, June 1992, pp. 68–71.

Skapinker, Michael. "Why Speaking English is No Longer Enough". *International Management,* November 1986, pp. 39–42.

Stanley, John, David Ingram and Gary Chittick. *The Relationship Between International Trade and Linguistic Competence.* Report to the Australian Advisory Council on Languages and Multicultural Education. Canberra: Australian Government Publishing Service, 1990.

Stentor Telecom Policy. *The Information Highway*. Ottawa: Stentor Policy Inc., 1993.

Tamura, R. "An Economics of Translators". Manuscript. Clemson University, 1996.

Toffler, A. *A Third Wave*. London: Pan, 1981.

Vaillancourt, F. "Les écrits en économie de la langue", in F. Vaillancourt (ed.) *Économie et langue*. Montréal: Éditeur officiel du Québec, 1985.

Whitehill, Arthur M. "American Trade Deficit: The Human Problems". *Business Horizons*, Vol. 31, No. 1, January-February 1988, 18–23.

3. SPEAK AND YE SHALL RECEIVE: LANGUAGE KNOWLEDGE AS HUMAN CAPITAL[1]

Krishna Pendakur
Department of Economics
Simon Fraser University

Ravi Pendakur[2]
Multiculturalism Canada
Department of Canadian Heritage

1. INTRODUCTION

Canada is unique among settler societies in the fact that it has two official languages as proclaimed by Act as well as state support for the learning of non-official languages. Implementation of the *Official Languages Act* takes the form of both regulatory and program measures which attempt to ensure that basic services are available to Canadians in both official languages and that opportunities are available for learning an additional official language. Support for the

---

[1] We wish to thank our friends and colleagues Fernando Mata and Jenna Hennebry, from the Ministry of Canadian Heritage, for all their help and commentaries. In addition, François Pagé, Duncan Wrighte, John O'Grady, Colin Geitzler, Réjean Lachapelle, Louise Marmen and Doug Norris, all from Statistics Canada, have provided us with a great deal of assistance in terms of the content as well as the technical aspects.

[2] The opinions expressed in the following report are those of the authors and do not necessarily reflect those of the Ministry of Canadian Heritage or Statistics Canada.

learning of non-official languages has been through the *Canadian Multiculturalism Act* which had a relatively small program for funding the development of teaching materials. As well, the province of Quebec has instituted laws which act to protect French as the dominant language in that province.

Official language use has been an area of intense political and academic interest in Canada, but this debate has largely been confined to demographic studies examining issues related to language use and transfer, particularly among and between official language groups. Studies such as these have looked at the long term viability of official language minority communities or the degree to which immigrant languages are retained from one generation to another (see for example: Lachapelle, 1989; Kralt and Pendakur, 1991). Many demographic processes related to language use are therefore fairly well understood. However, the economic value of language knowledge in Canada has not been as widely researched. Studies which have looked at economic payoffs to language knowledge are largely been confined to knowledge of official languages and bilingualism (see: Breton, 1978; Bloom and Grenier, 1992; Shapiro and Stelcner, 1987; Shapiro and Stelcner, 1997; Vaillancourt, 1992; Christofides and Swidinsky, 1997). This paper attempts to measure the economic returns to both official and non-official language knowledge. We look at both earnings and employment probabilities in relation to three types of language knowledge: official language knowledge, non-official language knowledge and mother tongue.

The reason this relationship is important is because language knowledge can be viewed as a skill, and as such there should accrue economic benefits. At both a societal and individual level, the ability of citizens to speak more than one language may provide a competitive edge by allowing people to work in different sectors of the economy, and by increasing opportunities for international trade and tourism. At an individual level, the ability to speak an additional language adds to the store of human capital by increasing the number of possible trade partners an individual can have and thus should have a positive effect on labour market performance.

However, at the other extreme, it is also possible that language knowledge could indirectly act as a barrier, particularly in the case of immigrants, because it acts as a marker by which the majority can label a minority. Thus, prospective employers can use accent and language to define "the other". This can then result in fewer opportunities within the work force. Polyglots may thus be in a rather unique position of having a piece of human capital which can both help and hinder employment opportunities.

Another interesting facet of language ability as human capital is the fact that language knowledge is one of the few pieces of human capital that can be both ascribed and attained. Thus, where schooling may be related to choice and ability, language use can come naturally (i.e.: by mother tongue) or can be gained later in life. Thus, within the context of human capital theory, we can treat mother tongue(s) as a form of exogenous human capital whereas, languages learned after childhood can be treated as endogenous. If returns to these two types of language acquisition are different, we might expect that the "true" return to language knowledge is the return to mother tongue. Comparing between these two categories potentially provides a very powerful test of human capital theory.

Given the continuum of possibilities, it would seem that labour scholars (both economic and sociological) could add a great deal to the study of language and the economy by including examining language knowledge as either a piece of human capital or a barrier to entry. Yet issues such as differential distribution across the labour market, or the value of language as an economic commodity have not been studied to any great extent. Where these issues have been examined, the focus has generally been on the place of the official language majorities. In other words, the few Canadian papers which have examined the confluence between labour and language, have concentrated on differences between the English and French population, rather than looking at the differences across all possible languages, both majority and minority (see for example: R. Fenwick, 1982; Bloom and Grenier, 1992). Where minority languages have been studied, it is mostly within the context of not knowing an official language (see for example, Evans and Kelly, 1986).

In part this is because language knowledge is multifaceted and often intrinsically related to being an immigrant. Thus, any net benefit to knowing a given language may be hidden by the fact that being an immigrant often has an economic cost (see for example, Akbari, 1992; Christophides and Swidinsky, 1994; Pendakur and Pendakur, 1997).

This makes defining the cost or benefit of knowing more than one language very difficult to measure, particularly with commonly available data sets. The other hurdle is related to the fact that the payoffs for language knowledge may be different across sectors of the economy, or certain regions of the country and often, this level of detail is not available.

2. RESEARCH QUESTION, METHODOLGY AND DATA

2a. The Question

This research seeks to explore two questions. The first concerns the degree to which language knowledge (both official and non-official) correlates with earnings within the wage labour market. The second question concerns the degree to which language knowledge is correlated with full-time full-year employment status. The intent is to explore the issue of language knowledge as human capital and look at how language knowledge affects both an individual's propensity to be employed and an individual's earnings once employed.

However, compared to other economic analyses of language use, we do not restrict ourselves to knowledge of official languages only. Rather we explore the relationships between official language knowledge, non-official language knowledge, mother tongue and earnings across a large number of language groups rather than confining ourselves to the official language majority groups. The advantage of such an approach is that payoffs to knowledge of non-official languages can also be explored and compared to payoffs for knowing the official languages.

If differences in the value of language human capital are a product of the numbers of people we can talk to, then it is likely that language "markets" are very local. Thus what "pays" in one region may not pay in another. For this reason, we concentrate our analysis on the three largest Census Metropolitan Areas (CMAs) in Canada—Montreal, Toronto and Vancouver, treating each as a separate language market. This allows us to explore the dynamics of language knowledge and economic payoffs in a way that is not traditionally carried out.

2b. Methodology

Our goal is to develop an understanding of the relationship between language knowledge and ability to gain full-time full-year employment as well as the degree to which language knowledge affects wages. Answering these two questions requires two different regression methodologies. Establishing the impact on wages and salaries is accomplished using a standard OLS regression with the natural log of individual earnings from wage labour sources as the dependent variable. We use logistic regression to assess the impact of language knowledge on the propensity to be in full-time full-year employment.

In both cases, one challenge to estimating the economic impact of knowing an additional language is piecing apart the benefit due to language knowledge versus that due to personal ability—perhaps people who have the ability to speak more than one language are also more able to gain higher wages. If this is true, then any benefit (or cost) measured in our model may be a product of personal ability rather than language knowledge. A similar problem occurs when one attempts to look at economic outcomes as a product of schooling—is it the schooling, or is it that people who go on to get more schooling are also personally more able to get higher wages. Problems related to such "endogenous" characteristics have posed major roadblocks for scholars interested in human capital and economic outcomes because researchers cannot be sure as to what they are measuring as an end product.

However, we suggest that the processes by which a language can be gained offer a unique opportunity to control for such methodological problems. Language knowledge can be gained in different ways and we propose that one way to approach the issue of personal productivity is to differentiate between language knowledge which is "natural" or known from birth and language knowledge which is gained later in life. This categorization is important because, while it can be argued that people who learn an additional language later in life may have other abilities which can affect performance in the labour force, it is far harder to envision this being the case for people who start out with two languages.

Mother tongue is formally defined as the first language(s) learned and still understood, and, while it is generally the case that people declare only one mother tongue, the Canadian census captures up to four languages reported as mother tongue. The difference between mother tongue responses and language knowledge responses can thus be used as indicators of languages which are present from childhood, as opposed to those which are gained later in life. For this reason, we divide language knowledge into major components as defined by official language knowledge, non-official language knowledge and mother tongue.

After initial analysis on official language knowledge, we conduct a more detailed analysis of language use and earnings by examining 13 specific non-official language knowledge groups. In this way it is possible to assess the value of knowing not only the two official languages, but also selected non-official languages, such as German, Italian, and Chinese.

2c. The Data

Our primary data set is a customized microdata file for individuals composed of selected variables from the 1991 Census 20% database.[3] The population examined is comprised of non-farm, permanent residents of Canada living in Montreal, Toronto and Vancouver.[4] We look at men and women aged 20 to 64, who are not in full time school attendance. Immigrants who had arrived in either 1990 or 1991 were dropped because of incomplete or missing income data. In the case of wage regressions, we looked only at men and women whose primary source of income was from employment in the wages labour sector.

The Variables

The census main base provides a unique opportunity to explore issues related to language because there is information on different types of language knowledge:

---

[3] The database we use is roughly equivalent to a 20% of the total population, however, confidentiality requires that we not release the actual counts.

[4] We initially ran regressions for Canada as a whole, however we restricted our analysis to the three CMAs because it quickly became apparent that different CMAs have very different pay-offs to language knowledge and are effectively different language markets.

- 'A question on official language knowledge tells us whether respondents feel they are able to speak English and/or French. Possible responses are English only, French only, both English and French or neither official language.
- A question on non-official language knowledge provides information on which languages other than English or French respondents feel they are able to speak.
- The responses to both these questions are based on the respondent's self assessment of his or her ability to "conduct a conversation" in the given language. Up to three non-official languages are captured.
- A question on mother tongue provides information on the first language learned and still understood.[5]
- While the mother tongue question is designed to elicit a single response, a maximum of four responses are captured from the mother tongue question (English and French are captured separately, along with up to two write-in responses).[6]

We use the combinations of language responses to explore five types of language knowledge. As a first stage we look simply at official language knowledge in order to examine differences in knowing English, French, both English and French, and neither English nor French.

In the next stage of the analysis we divide these four basic categories of official language knowledge by the number of non-official languages known (ie: English plus one, two or three non-official languages). This provides us with an indication of the degree to which labour market outcomes are affected by the number of languages known. In the third stage, we look at the way in which language knowledge came about by combining categories of mother tongue, official language knowledge and non-official language. This allows us to compare people who know both official languages by way of mother tongue to those who have learnt an additional official language later in life. In the same way, we can compare individuals who started off with both a non-official language and an official language to those who started with a non-official language as mother tongue and then learned an official language later. In the fourth and last stage, we take a look at the 13 most frequently reported non-official languages in order to examine the relationship between the returns to non-official language knowledge.

---

[5] There is also a question asked on which language is spoken most often at home. However, we did not use the results of this question in our analysis, in part because we wished to explore language knowledge rather than the more restrictive issue of languages spoken at home.

[6] The mother tongue question asks "What is the language that [the respondent] first learned at home in childhood and still understands." It is thus designed to draw a single response. Despite this, there are people to respond that they have more than one mother tongue. However, cross-census comparisons (by Réjean Lachapelle) indicate that the pattern of responses is unstable in that the same people do not always report multiple languages from one census to another.

Along with the language variables we include as independent variables, categories for:

- Canadian-born ethnicity including 20 european origin groups, aboriginal and visible minority ethnic groups (for a total of 35 categories);
- Place of birth (11 categories);
- Foreign place of birth interacted with visible minority status (10 categories);
- Census family status (4 categories);
- Canadian schooling (21 categories);
- Foreign schooling in four levels by ten foreign places of birth (40 categories);
- Full-time/Part-time status (2 categories);
- Weeks Worked (11 categories); and;
- Specific occupations with high levels of unreported income—tips (6 categories).

As well, we include continuous measures (and their squares) of potential labour market experience in Canada and in ten regions outside Canada for immigrants. Potential labour market experience in Canada is an estimated variable and is equal to either years since completion of schooling or years since immigration, whichever is less. In the case of immigrants, potential labour market experience outside Canada is separated into ten regions, and is equal to years between completion of schooling and immigration to Canada. We assume that their labour market experience outside Canada is the same as their region of birth. Finally we have included ten continuous variables which provide interactions of Canadian experience and foreign experience for immigrants interacted with ten places of birth.

3. RESULTS

3a. Official Language Knowledge

Table 1a shows selected coefficients from log-earnings regressions on workers age 20 to 64 not in school full time, whose primary source of income was from wages and salaries in Canada's three largest Census Metropolitan Areas (CMAs). The table shows the differences in log earnings due to knowledge of Canada's official languages, controlling for place of birth (interacted with visible minority status), ethnicity, household type, education (in Canada and ten foreign regions), potential experience (in Canada and ten foreign regions), full-time/part-time status and weeks worked. The coefficients reported show the differences in log-earnings (which may be interpreted as

Table 1a Returns to Official Language Knowledge, by Sex, 1991

Official Language	Montreal Coef.	Montreal Sig.	Toronto Coef.	Toronto Sig.	Vancouver Coef.	Vancouver Sig.
Males						
English	comparison		comparison		comparison	
French	-0.018		0.064	†	-0.021	†
Bilingual	0.049***		0.037***		-0.019	
Neither	-0.171***		-0.129***		-0.096***	
Females						
English	comparison		comparison		comparison	
French	-0.02*		0.01	†	-0.22	†
Bilingual	0.06***		0.03***		-0.02	
Neither	-0.10***		-0.18***		-0.10***	

Source : Custom microdata file for individuals,
1991 Census of Canada, population age 20-64 not in school full time.
Individuals whose primary source of income is wages and salaries

Note: †: less than 200 weighted cases

Significance: *:0.1 level; **: 0.05 level; ***: 0.01 level percentage differences in earnings) among men or among women who differ in their official language knowledge, but not in place of birth, ethnicity, household type, education, experience, full-time status and weeks worked. In all cases, the dropped category is English unilinguals, so that percent differences are in comparison to English unilinguals. The top panel shows information for males and the bottom panel shows the same type of regression output for females.

Looking first at official language unilinguals, in the case of males, it appears that French unilinguals do not earn significantly less than English unilinguals.[7] It is particularly interesting to see this insignificant difference in Montreal, where there is a large population of French unilinguals, and where there is a history of French unilinguals earning less than English unilinguals (see Shapiro and Stelcner: 1987; Christophides and Swidinsky, 1994, 1997). However, it seems that based on data from the 1991 Census, and conditional on other individual characteristics, French unilingual males earn about the same as English unilinguals in all three CMAs. For females, the picture is somewhat different. While French unilinguals do not face a significant penalty in either Toronto or Vancouver, they do face a two percent penalty in Montreal.

English-French bilinguals earn more than English unilinguals in both Montreal and Toronto. Men and women able to speak both official languages earn statistically significant premiums over English unilinguals of up to 6 percent in Montreal and Toronto. However, in Vancouver, those able to speak both official languages earn about the same as English unilinguals. This difference in the role of language in earnings outcomes between Vancouver, Toronto and Montreal is the first of many such differences across the CMAs we find in these data.

Not knowing an official language hurts workers in all three CMAs. As expected, almost all workers without official language ability are immigrants. However, the majority of immigrants do speak an official language, even at the time of entry. Thus, since we control for place of birth, foreign education, foreign experience and visible minority status, we can identify the effects of language knowledge *independent* of immigration status. For men, workers in Montreal who do not speak English or French earn 17 percent less than unilingual English workers. In Toronto, the corresponding earnings gap is 13 percent, while in Vancouver, it is 10 percent. In the case of women, the situation is comparable, with those in Montreal earning 10 percent less, and those in Toronto facing the largest gap at 18 percent less. Overall, although workers who do not speak an official language earn significantly less than official language speakers in all three cities, the differential is smaller in Vancouver than in Montreal or Toronto.

---

[7] It should be noted however, that there are very few French unilinguals (either male or female) living in Vancouver and Toronto.

The results in Table 1a are broadly consistent with the findings of previous research concerning the effects of official language knowledge on earnings. However, while previous research has focused on Quebec, or on Canada as a whole, we offer distinct findings for three large urban labour markets. Indeed, we see some striking differences in the effects of official language knowledge on earnings across Canada's three largest CMAs which suggest that the payoffs to knowing both official languages are highly localized. It also points to the fact that there are differences in the way men and women are able to take advantage of language knowledge.

Table 1b Conditional Odds of Full-time Full-year Employment by Official Language Knowledge by Sex in Selected CMAs, 1991

	Montreal		Toronto		Vancouver	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Males						
English	comparison		comparison		comparison	
French	1.28***		0.48	†	0.21***	†
Bilingual	1.58***		1.12**		0.88**	
Neither	0.09***		0.38***		1.01	
Females						
English	comparison		comparison		comparison	
French	0.97		0.60		0.30	†
Bilingual	1.34***		1.01		0.94	
Neither	0.64***		0.60***		0.64***	

Source : Custom microdata file for individuals,
1991 Census of Canada, population age 20-64 not in school full time.
Note: †: less than 200 weighted cases
Significance: *:0.1 level; **: 0.05 level; ***: 0.01 level

Table 1b shows selected conditional odds from logit regressions on all workers age 20 to 64 who are not in school full time, in Canada's three largest CMAs. The dependent variable is a flag indicating Full Time Full-Year (FTFY) working status, and the independent variables are controls for place of birth (interacted with visible minority status), ethnicity, household type, education (in Canada and ten foreign regions), and potential experience (in Canada and ten foreign regions). The estimates reported show the differences in FTFY work probabilities (evaluated at mean characteristics) for men who differ in their official language knowledge, but not in place of birth, ethnicity, household type, education and experience. The conditional odds indicate the likelihood of full-time full year employment as compared to the comparison group—English unilingual. The conditional odds are expressed as ratios. Thus a one to one ratio indicates that the odds of being employed are the same as the comparison group. Values higher than one indicate a greater probability of employment and values lower than one indicate a lower likelihood of full-time full-year employment.

These results show different patterns across official language knowledge groups than those we saw in Table 1a. Looking first at males, while French unilingual workers do not earn less than English unilingual workers in any of the three cities, French unilingual men are somewhat more likely to have full-time full-year work in Montreal (.21 and 1.28 respectively). The difference in FTFY work probabilities between official language bilinguals and English unilinguals is also quite different across cities. Official language bilinguals are 1.5 times more likely than English unilinguals to have FTFY work in Montreal, and 1.12 times more likely in Toronto. However, in Vancouver, official language bilingual males are less likely to be employed FTFY. Turning to men who speak neither English nor French, we see that in Montreal and Toronto, it is very unlikely that they will have full-time full year employment. However, in Vancouver, the conditional odds of employment for this group is about the same as it is for unilingual anglophones with similar characteristic.

Looking at women we see little difference between unilingual francophones and the comparison group unilingual anglophone women. However, official language bilingual women in Montreal are

1.34 times more likely to be employed FTFY, while women unable to speak an official language are only about 0.6 times as likely to be employed FTFY.

The results presented in Tables 1a and 1b are consistent with previous research in finding very large returns to knowledge of either official language in terms of earnings (conditional on work) and in terms of FTFY work probabilities (see Stelcner and Shapiro, 1987). We also confirm the finding that official language bilinguals may earn more and have higher FTFY work probabilities than official language unilinguals. However, we find striking differences across the three CMAs: on the whole it seems that knowledge of either official language is always good for the individual. However, being unilingual Francophone in either Toronto or Vancouver, places one in a situation similar to that of persons unable to speak an official language. Further, it seems that official language bilinguals have the largest advantage over English unilinguals in Montreal, and may face some disadvantage in Toronto and Vancouver in their ability to get full-time full-year employment.

Comparing the results of the two tables, it appears that among men, being unilingual francophone in Montreal actually helps job prospects, but does not necessarily increase wages. Being a bilingual male however, helps both job prospects and wages in Montreal, but actually hurts job prospects in Vancouver. The situation is similar for women in Montreal, with bilingualism associated with both better job prospects and higher wages but not in Vancouver.

These kinds of differences across CMAs suggest that the *market* for official language knowledge is local, and not national. Further, the differences between Montreal and the other two CMAs indicates that the differences in payoffs to official language knowledge may be related to differences in the compositions of the three cities. The next subsection explores links between *non-official* language knowledge and labour market outcomes.

3b. Non-official Language Knowledge

Table 2a shows selected coefficients from log earnings regressions on all workers in Canada's three largest CMAs. The coefficients reported show the differences in log earnings for men who differ in their

Table 2a Returns to Language Knowledge, Official and Non-Official by Sex, Selected CMAs, 1991

CMA	Official Language Knowledge	Non-Official Language Knowledge							
		No NOLs		One NOL		Two Nols		Three NOLs	
		Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Males									
Montreal	English	comparison		-0.126***		-0.131***		-0.085	
	French	-0.018		0.043**		-0.025		-0.239**	
	Bilingual	0.049***		0.035**		0.02		-0.060**	
	Neither	n.a.		-0.171***		-0.090		0.463	
Toronto	English	comparison		-0.052***		-0.068***		-0.056***	
	French	0.064	†	0.130	†	0.093	†	0.051	†
	Bilingual	0.037***		0.019		-0.036		-0.008	
	Neither	n.a.		-0.129***		-0.164***		-0.099	
Vancouver	English	comparison		-0.033***		-0.034		-0.041	†
	French	-0.021	†	0.219	†	n.e.		n.e.	
	Bilingual	-0.019		-0.086***		-0.095**		-0.314***	†
	Neither	n.a.		-0.096***		0.035		-0.072	†
Females									
Montreal	English	comparison		-0.05**		-0.09**		0.08	
	French	-0.02*		0.03		0.03		-0.13	
	Bilingual	0.06***		0.03**		0.05**		0.02	
	Neither	n.a.		-0.10***		-0.10		0.23	†
Toronto	English	comparison		-0.04***		-0.05***		-0.03	
	French	0.01	†	0.26*	†	0.14	†	0.53	†
	Bilingual	0.03***		-0.01		0.01		-0.02	
	Neither	n.a.		-0.18***		-0.15***		0.07	†
Vancouver	English	comparison		-0.02		0.00		-0.02	
	French	-0.22	†	-0.11	†	-0.05	†	n.e.	
	Bilingual	-0.02		-0.05*		-0.02		0.02	
	Neither	n.a.		-0.10***		-0.13*		0.10	†

Source : Custom microdata file for individuals,
1991 Census of Canada, population age 20-64 not in school full time.
Individuals whose primary source of income is wages and salaries
Note: †: less than 200 weighted cases
Significance: *:0.1 level; **: 0.05 level; ***: 0.01 level; n.a.: not applicable;
n.e.: not estimated

official language knowledge *and* non-official language knowledge, but do not differ in place of birth, ethnicity, household type, education, experience, full-time status and weeks worked. Estimated coefficients are given by CMA, official language knowledge, and by number of non-official languages known. We find three dominant patterns in Table 2a. First, on the face of it, knowledge of non-official languages appears to be bad for earnings. In Montreal, men who speak English and one non-official language earn 13 percent less than English unilinguals, and men who speak French and one non-official language earn about 4 percent less than English unilinguals. In Toronto and Vancouver, men who speak English and one non-official language respectively earn 5 percent and 3 percent less than English unilinguals. For all three CMAs, and for all three degrees of non-official language knowledge, all of the statistically significant coefficients on non-official language knowledge are negative.

For women, although the same type of pattern is evident, there are differences. Bilingual women in Montreal can expect a bonus even if they speak an additional non-official language of between 3 and 6 percent. However in the other CMAs, knowledge of a non-official language hurts income levels.

Second, in most cases, the marginal effects of non-official language for men seem to be negative. Given official language knowledge, men who know two non-official languages earn less than men who know just one non-official language (only some of these differences *between* coefficients are statistically significant). For women, the pattern is more varied. While it is often the case that knowledge of non-official languages hurts income possibilities, it is not necessarily the case that more languages hurt more. Thus while women in Toronto able to speak English and two additional languages earn comparatively less than those able to speak only one non-official language, this is not the case in Vancouver.

Third, for both men and women, the earnings gaps due to non-official language knowledge are smaller in Vancouver than in the other two CMAs.

Table 2b shows selected conditional odds ratios from logit regressions analogous to those in Table 2a. The dependent variable is a full-time full-year flag, and the independent variables are controls for place of

Table 2b Conditional Odds of Full-time Full-year Employment by Official and Non-Official Language Knowledge by Sex in Selected CMAs, 1991

CMA	Official Language Knowledge	Non-Official Language Knowledge							
		No NOLs		One NOL		Two NOLS		Three NOLs	
		Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Males									
Montreal	English	comparison		0.20		0.58		39.37	
	French	1.28	***	1.19		0.55		0.00	***
	Bilingual	1.58	***	1.38	***	1.09		0.94	
	Neither	n.a..		0.09	***	317.15		0.00	***†
Toronto	English	comparison		0.87	***	0.72	*	0.52	*
	French	0.48	†	0.00	†	0.00	***†	0.00	***†
	Bilingual	1.12	**	1.00		0.74		0.80	
	Neither	n.a..		0.38	***	0.22	***	0.00	***
Vancouver	English	comparison		0.90	*	0.63	**	1.20	
	French	0.21	***†	0.01	†	n.e.		n.e.	
	Bilingual	0.88	**	0.80	*	0.93		0.76	
	Neither	n.a..		1.01		0.00	***	0.00	***
Females									
Montreal	English	comparison		0.83	***	0.76	***	1.16	
	French	0.97		0.91	**	0.96		0.59	* †
	Bilingual	1.34	***	1.12	***	1.21	***	1.34	***
	Neither	n.a.		0.64	***	0.55	**	1.20	†
Toronto	English	comparison		0.87	***	0.90	***	0.82	***
	French	0.60	†	0.46	** †	0.24	†	60.21	†
	Bilingual	1.01		0.89	***	0.83	***	0.78	**
	Neither	n.a..		0.60	***	0.75	**	0.21	** †
Vancouver	English	comparison		0.92	***	0.93		1.00	
	French	0.30	†	0.46	†	2.71	†	n.e.	
	Bilingual	0.94		0.83	***	0.72	***	1.21	
	Neither	n.a..		0.64	***	0.73		0.43	†

Source :	Custom microdata file for individuals, 1991 Census of Canada, population age 20-64 not in school full time.
Note:	†: less than 200 weighted cases
Significance:	*:0.1 level; **: 0.05 level; ***: 0.01 level; n.a.: not applicable; n.e.: not estimated

birth, ethnicity, household type, education, potential experience. The estimates reported show the likelihood of FTFY employment for men and women who differ in their official language knowledge and non-official language knowledge, but are otherwise identical. As in the earnings regressions, the pattern for men and women is different.

In Montreal men who speak one official language in combination with a non-official language are no more likely to be employed all year full time than is the case for unilingual anglophones. However, for women, in most cases, knowing a non-official language in combination with one official language results in lower probabilities of employment. The situation for official language bilinguals is a little different. As was seen in table 1a and 1b, bilinguals in Montreal have higher odds of being employed FTFY. This is carried through for those able to speak a non-official language, particularly in the case of women, however the propensity to be employed FTFY does decrease somewhat with non-official language knowledge. In both Toronto and Vancouver, the impact of non-official language knowledge is either non-existent or negative, particularly in the case of women. This suggests that in Montreal, people able to speak non-official languages are able to use that knowledge to their advantage, whereas this is not the case in the other two CMAs.

If language knowledge is a form of human capital, then the results in Sections 3a and 3b suggest that dominant official language knowledge ability (French in Montreal and English in Vancouver and Toronto), is to varying degrees, correlated with better labour market outcomes in terms of earnings and FTFY employment probabilities.

It also suggests that the three CMAs are distinct markets for these forms of human capital. However, the econometrics of human capital have long been plagued by problems of correlations with unobserved variables. For example, if the type of people who acquire any particular form of human capital are also more likely to have other abilities which are valued in the labour market then we may be confusing personal ability with a return to language knowledge. In the next section, we address this issue by exploring the returns to mother tongue in the context of human capital theory.

Quebec's Charter of the French Language:

Quebec's Charter of the French Language (Bill 101), introduced in 1977, is an additional and important language policy which has not been discussed in this pape. One provision of this law requires the children of immigrants to Quebec to attend French language elementary and secondary schools, if they choose to enter the public school system. Children of immigrants who were schooled in English language schools in Canada are eligible to attend English language schools (see McAndrew and Lamarre, 1996).

This means that the children of recent immigrants who started their schooling after 1977 were required, in the vast majority of cases, to enter French language schools. Prior to this year, immigrants could enter either language system and usually chose to enter the English language school system (Comité interministériel sur la situation de la langue français: 1996).

We attempted to test the impact this provision had on the wages and job prospects of immigrants by looking at immigrants living in Montreal who were born from 1965 to 1971. These immigrants were from six to twelve years old by 1977. This population was divided into two groups, one comprised of people arriving in 1974 to 1976, the other made up of immigrants who came to Canada in 1977 to 1979. We thus compare immigrants who started their schooling before the law took effect to a group who arrived after the introduction of the law. The comparison is therefore between immigrants who had a choice of school language alternatives (the pre–1977 group) to immigrants who did not. One caveat to our analysis is that it assumes there was no migration (ie: we assume that immigrants in our sample were schooled in Montreal and remained in the CMA). However we are comfortable with this assumption in part because we can use our controls on language knowledge as a marker, particularly for the post-Bill 101 group which was more than likely schooled in French, in Quebec as opposed to other provinces where the dominant schooling language is English (with the possible exception of New Brunswick, which is not a centre for immigrant intake).

As was done for the entire population, in table 2, we controlled for place of birth, visible minority status, schooling, weeks worked, family status, official language knowledge and work experience (derived from age and years of schooling).

We were unable to find any statistically significant difference between the two groups for either males or females either in wages or propensity to be employed full-time full-year. In other words, immigrants who entered the public school system who did not have a choice as to the language of schooling, appear to have done as well (or as poorly) as those who arrived prior to the introduction of the law. In the same way, tests of ability to get full time full year work using logistic regression did not reveal any statistically significant differences between the two groups.

3c. Mother Tongue Versus Learned Language

The previous sections have looked only at ability to speak English or French in combination with non-official languages, but have ignored the way in which this language knowledge is acquired. This is problematic because language acquisition can be thought of as divided into two forms—a language can be acquired either 1. as a child or 2. later in life. It is possible that these two "paths" to language knowledge can lead to different types of payoffs because they can also be thought of as indicators of comfort level with a given language (ie: people who speak a language by right of mother tongue may be more comfortable with that language than those who learn that language later in life).

In this subsection, we argue that including mother tongue as part of language knowledge has the potential to provide analysts with a means of differentiating between the returns to unobserved ability and the returns to human capital. Mother tongue is defined in the 1991 Census database as the first language learned and still understood by the respondent.[8] Since it is learned in childhood, we believe that mother tongue language can be treated as if it were *not* chosen. On the other hand, languages that are not learned as mother tongue are much more likely to be learned later in life, and therefore more likely to be learned as a result of a conscious choice. For people who learn languages as the result of a conscious choice, there is an immediate estimation problem. In particular, people who *choose* to learn additional languages may be different from people who know the language by virtue of mother tongue(s); language learners may be more able or more motivated in otherwise unobservable ways than non-learners. If so, then the estimated return to language knowledge will include both the return to language knowledge and the return to these unobserved characteristics. In contrast, the estimated return to mother tongue should be unpolluted by correlations with unobserved variables. Thus, we argue that the return to language knowledge in a pure human capital model with unobserved productivity-related characteristics should be given by the measured return to mother tongue.

To assess the true return to language knowledge, we separate individuals who have the same language knowledge into two categories: those who learned the language in childhood as mother tongue, and those who learned the language later in life. Since everyone has at least one mother tongue, this distinction is only relevant for people who know at least two languages; we can ask whether or not the second language is a mother tongue or not. Table 3a shows selected coefficients from log earnings regressions with the

---

[8] Although the question is designed to elicit a single response, up to 4 mother tongues are captured (English, French and up to two additional non-official write-in responses).

Table 3a Selected Coefficients from Log-Earnings Regressions: Paths to Language Knowledge, Selected CMAs, 1991

Panel A

CMA	Mother Tongue			Additional Language Knowledge							
		None		Other Official				Nonofficial			
				Mother		Learned		Mother		Learned	
		Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Males											
Montreal	English	comparison		-0.065	**	0.049	***	0.000		-0.056	
	French	-0.012				0.057	***	-0.202	***	-0.115	***
Toronto	English	comparison		-0.074		0.037	***	-0.120	***	-0.043	***
	French	0.064	†			0.045	**	0.226	†	-0.485	†
Vancouver	English	comparison		-0.240	**	0.016		-0.055		-0.013	
	French	-0.024	†			-0.018		n.e.		n.e.	
Females											
Montreal	English	comparison		0.030		0.053	***	-0.153	**	-0.070	
	French	-0.001				0.087	***	0.042		-0.011	
Toronto	English	comparison		-0.064		0.038	***	-0.027		0.017	
	French	-0.001	†			0.012		0.336	†	n.e.	
Vancouver	English	comparison		-0.235	***	-0.008		-0.054		-0.014	
	French	-0.235	†			-0.046		n.e.	†	-0.099	

Panel B

CMA	Mother Tongue		Additional Language Knowledge			
		None	Other Official		Nonofficial	
			Mother	Learned	Mother	Learned
Males						
Montreal	Nonofficial	-0.173***	0.000	-0.142***	-0.202***	-0.028
Toronto	Nonofficial	-0.127***	-0.120***	-0.049***	0.226 †	0.176 †
Vancouver	Nonofficial	-0.101***	-0.055	-0.041***	n.e. †	0.213 †
Females						
Montreal	Nonofficial	-0.115***	-0.153**	-0.054**	0.042	-0.038*
Toronto	Nonofficial	-0.192***	-0.027	-0.048***	0.336 †	0.255
Vancouver	Nonofficial	-0.105***	-0.054	-0.026*	n.e. †	-0.122 †

Source :	Custom microdata file for individuals, 1991 Census of Canada, population age 20-64 not in school full time.
Note:	†: less than 200 weighted cases
Significance:	*:0.1 level; **: 0.05 level; ***: 0.01 level; n.a.: not applicable; n.e.: not estimated

same controls as in Tables 1a and 2a. Here, estimates are shown for all unilingual and bilingual men by official language knowledge and by whether or not additional language knowledge was acquired by mother tongue or learned later in life.

The table is divided into two panels. Panel A (the top part) displays information for men and women who have either English or French as a mother tongue (the official languages). Panel B displays information for men and women who have a non-official language as a mother tongue. There is some repetition across the two panels because people can report more than one mother tongue. Thus people who claim both an official language and a non-official language are represented on both panels. Thus, the coefficients in the second to last column of Panel A, (non-official mother tongue) are repeated in the second and fourth column of Panel B.

With the anatomy of Table 3 explained, it is now possible to look at the findings. Looking first at official languages, we see that in all three CMAs, official language bilingual men who have one official language as mother tongue and the other as a learned language earn significantly more than unilingual anglophones. In Montreal, men who know both official languages by virtue of mother tongue, however, earn 7 percent less than English unilinguals. In contrast, men whose mother tongue is English only and have learned French earn 5 percent *more* than English unilinguals. Men whose mother tongue is French only and have learned English earn 6 percent more than English unilinguals. Thus, there is an 11 percent earnings difference between men who have knowledge of both official languages by mother tongue and men who have knowledge of both official languages where one language is learned later in life, even though these two groups know the same languages. We see a similar pattern among official language bilinguals in Toronto and Vancouver.

The results for women are similar. Women in Montreal with either English or French as mother tongue, who have learned the other official language earn 5 to 8% more than unilingual anglophone women. In Toronto, although there is payoff for anglophones who learn French, the reverse is not true and in Vancouver, as was the case for men, we found no payoff for learning an additional official language.

The returns to non-official mother tongues and non-official learned languages for men starting with English or French are shown on the right-hand side of Table 3a. The pattern observed for official languages seems to hold here as well: for mother tongue French men in Montreal and mother tongue English men in Toronto, learning a non-official language is correlated with better earnings outcomes than having a non-official language as an additional mother tongue. For the results shown in the top panel of Table 3a, we note that once again, the estimates for Vancouver reveal a different pattern from those for Toronto and Montreal. In particular, for men with a single official language mother tongue, learners of an official or non-official language earn neither more nor less than English unilinguals.

For women with non-official language knowledge, (either by virtue of mother tongue or learned), the pattern is somewhat different. First, as opposed to the case for men where four of the coefficients are negative and significant (in Montreal and Toronto), for women, this is only true for one case—women in Montreal with English and a non-official language as mother tongue. Thus on the surface it appears that knowing a non-official language may be less of a barrier to women than it is for men.

The bottom panel of Table 3a explores this possibility in more depth. Panel B shows estimates for men and women with a non-official mother tongue in combination with either an English or French (learned or by mother tongue). The patterns are very different in the three CMAs. In Montreal, while men with a non-official mother tongue who have French as an additional mother tongue earn 20 percent less than English unilinguals, men with a non-official mother tongue who have learned French earn almost the same as English unilinguals. Similarly, among Toronto men those who have English and a non-official language as a mother tongue earn 12 percent less than English unilinguals and those who learned English (but started with a non-official language) earn only 5 percent less than English unilinguals. As was the case in Tables 1 and 2, not knowing an official language hurts. Thus both men and women unable to speak English or French can expect to receive between 10% and 19% less than unilingual anglophones. However, the magnitude of the penalty varies across cities. Thus, the penalty tends to be lower in Vancouver and higher in Montreal and Toronto.

Table 3b Conditional Odds of Full-time Employment by Official Selected CMAs, 1991

Panel A

		Additional Language Knowledge									
CMA	**Mother Tongue**	None		Other Official				Nonofficial			
				Mother		Learned		Mother		Learned	
		Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Males											
Montreal	English	comparison		0.760***		1.180***		0.580***		0.900	
	French	0.840***				1.060		0.900		0.790**	
Toronto	English	comparison		0.860		0.920***		0.790***		0.900***	
	French	0.240**	†			0.960		0.220	†	0.600	†
Vancouver	English	comparison		0.450***		0.850***		0.730***		0.830***	
	French	0.320**	†			0.840**		n.e.		0.020	†
Females											
Montreal	English	comparison		1.310***		1.358***		0.608***		0.930	
	French	0.953				1.323***		0.801		0.893	
Toronto	English	comparison		0.883		1.015		0.856***		0.915***	
	French	0.595				1.015		0.517	†	0.026	†
Vancouver	English	comparison		1.121		0.937		0.793**		0.945	
	French	0.301	†			0.950		n.e.		0.284	†

Panel B

		Additional Language Knowledge				
CMA	**Mother Tongue**	None	Other Official		Nonofficial	
			Mother	Learned	Mother	Learned
Males						
Montreal	Nonofficial	0.580***	0.510	0.770**	0.790**	0.680***
Toronto	Nonofficial	0.610***	0.910	0.860***	0.600 †	0.350 †
Vancouver	Nonofficial	0.650***	0.550**	0.670***	0.020 †	n.e.
Females						
Montreal	Nonofficial	0.640***	0.608***	0.828***	0.801	0.916*
Toronto	Nonofficial	0.584***	0.856***	0.849***	0.517 †	0.481**
Vancouver	Nonofficial	0.622***	0.793**	0.888***	n.e. †	0.597 †

Source : Custom microdata file for individuals,
1991 Census of Canada, population age 20-64 not in school full time.
Note: †: less than 200 weighted cases
Significance: *:0.1 level; **: 0.05 level; ***: 0.01 level; n.a.: not applicable;
n.e.: not estimated

BEST COPY AVAILABLE

Looking specifically at women, it appears that the penalties for learning a non-official language tend to be lower than was the case for men. Thus, while men who learn a non-official language face a penalty of between 4 and 14%, women face a much smaller penalty of between 3 and 5%. Women with both an official and a non-official language as mother tongue tend not to face a wage penalty except in the case of women in Montreal who have English and a non-official language as mother tongue.

Table 3b shows selected conditional odds from logit regressions analogous to those in Table 3a. The dependent variable is a FTFY flag, and the independent variables are controls for place of birth, ethnicity, household type, education, potential experience. The conditional odds of having FTFY work (evaluated at mean characteristics) for men and women who differ in their official language mother tongue status and in whether or not their additional languages are mother tongues, but are otherwise identical. In the earnings regressions, learning languages was found to be associated with higher wages. In the case of work probabilities, the story is a bit more mixed. In Montreal, for example, anglophone men who learned French, were 18 points higher than for unilingual English men. However, in the other CMAs, people who learned an additional language either faced a decreased probability of employment, or there was no effect. This is true regardless of whether the learned language is an official or a non-official language. This pattern of learners having higher FTFY work probabilities holds for persons with non-official mother tongues as well (shown in the bottom panel of Table 3b). The same pattern generally holds true for women, however in the case of women, there are fewer significant results, suggesting that additional learned languages have a lesser impact on the employment opportunities of women than men. There are, however, two exceptions to this statement. Women living in Montreal who learn the other official language show large higher probabilities of FTFY employment (1.36 and 1.32 times)

Men who know two official languages by right of mother tongue often face statistically significant lower probabilities of employment than those who learn an additional official language. Men in Montreal and Vancouver who have both English and French as mother tongue face much lower probabilities of FTFY employment than is the case for unilingual anglophones. Women who speak both official languages by right of mother tongue, however, either face no penalty, or as in the case of Montreal, have a higher probability of FTFY employment. This is surprising because it suggests that the opportunities for people who have two official languages as mother tongue are fundamentally different depending on whether one is male or female. It also suggests that there are big differences between learning an additional language and knowing two languages from childhood.

It seems, then, that the returns to language knowledge (either as earnings or FTFY work probabilities) are different between those who have additional mother tongues and those who learn additional languages later in life. In particular, it is broadly true across CMAs and mother tongue categories that people who have language knowledge by virtue of mother tongue earn less and have lower FTFY work probabilities than people who have language knowledge by learning later in life. This pattern could be due to the correlation of language learning with unobserved individual characteristics. In this case, the true return to language knowledge is given by the return to mother tongue language knowledge. However, it seems from Table 3a and Table 3b that for both official and non-official language knowledge, the return to mother tongue is negative. In the next subsection, we take a slightly different approach. We push to the side the issue of why the returns to language knowledge are negative and focus on how the returns to language knowledge differ across Canada's 13 largest non-official languages.

3d. Returns to Specific Languages

Table 4a shows selected coefficients from log earnings regressions with the same controls as in Tables 1a, 2a and 3a. Previously, coefficients for non-official language were allowed to vary with official language but not by particular non-official language. However, in these regressions, respondents living in the three CMAs were pooled and interactions were created for each CMA-language combination. Further the return to non-official language knowledge is not allowed to vary across official language, but is allowed to vary by 39 non-official language-CMA combinations. For example, the earnings difference for Italian speakers in Montreal is required to be the same for men who speak either, both or neither official language.

Table 4a Returns to Non-official Language Knowledge, for Males and Females for Selected CMAs, 1991

	Montreal		Toronto		Vancouver	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Males						
German	-0.018		0.002		-0.025	
Greek	-0.303	***	-0.152	***	-0.078	
Italian	-0.071	***	-0.016		-0.007	
Polish	-0.068		0.004		-0.017	
Portuguese	-0.021		0.003		0.069	
Spanish	-0.066	***	-0.098	***	-0.066	**
Ukrainian	-0.157	**	-0.028		-0.020	
Arab	-0.145	***	-0.070	**	-0.214	**
Hindi	0.065		-0.054		-0.235	***
Punjabi	-0.180	*	-0.140	***	-0.083	
Chinese	-0.073		-0.033		0.046	
Tagalog	-0.216	**	-0.136	***	-0.107	**
Vietnamese	0.072		-0.185	***	-0.002	
Neither E/F	-0.075	**	-0.075	***	-0.088	***
Females						
German	-0.010		-0.021		0.002	
Greek	-0.139	***	-0.009		0.071	
Italian	-0.068	***	-0.012		0.013	
Polish	-0.112	**	-0.024		0.031	
Portuguese	-0.076	**	-0.026		-0.054	
Spanish	0.004		-0.067	***	-0.037	
Ukrainian	-0.058		0.004		0.113	**
Arab	-0.087	**	-0.193	***	0.062	
Hindi	-0.122		-0.152	***	-0.161	**
Punjabi	-0.164		-0.184	***	-0.086	
Chinese	-0.038		0.041		0.003	
Tagalog	0.101		-0.102	***	-0.077	*
Vietnamese	-0.026		-0.253	***	-0.124	*

Source:	1991 Census of Canada individual file, population 20-64 not in school full time.
Selection:	Population whose primary source of income is wages and salaries
Significance:	*: 0.1 level; **: 0.05 level; ***: 0.01 level
Note:	Coefficients are reported for persons who speak one non-official language or less.

The first thing that is readily apparent is that all save for one of the significant coefficients are negative. Thus, except for the unique case of female Ukrainian speakers in Vancouver, an ability to speak one of the top 13 non-official languages either does not help an individual's income, or it is indicative of an income penalty.

That said, it is also apparent that there are substantial differences by both CMA and genders. Looking first at males, it appears that Spanish, Arabic and Tagalog speakers face large wage penalties in all three CMAs of between 7 and 22%. In addition, Greek, Arabic, Punjabi, Tagalog and Ukrainian speakers in Montreal all faced penalties in excess of 15%. This was also true for Greek and Vietnamese speakers in Toronto and Arabic and Hindi speakers in Vancouver. Overall, however, the penalties tended to be highest in Montreal, followed by Toronto and Vancouver.

Women were less likely to face a wage penalty than was the case for men. However, also indicative of the difference between men and women is the fact that no single women's language group faced a penalty in all three CMAs. For example, Greek, Italian speaking women faced a penalty of between 7 and 14% in Montreal, but not in Toronto or Vancouver. Spanish and Punjabi speaking women however faced a 7% and 18% wage penalty in Toronto, but not in Montreal or Vancouver.

What is also apparent is that for both men and women, fewer groups faced negative wage differentials in Vancouver than in the other two CMAs. Thus, while four female-language combinations showed significant penalties in Vancouver, this was true of five groups in Montreal and six in Toronto. For male-language combinations this was true of seven language groups in Montreal, six in Toronto and four in Vancouver.

Thus, while the results in Table 2a suggest that non-official language is associated with lower earnings, the estimates in Table 4a suggest that not all non-official languages are equal; languages like Spanish, Arabic, Tagalog and Greek may be associated with lower earnings than languages like German or Chinese.

Table 4b Conditional Odds of Full-year Employment by Non-Official Language Knowledge for Males and Females for Selected CMAs, 1991

	Montreal		Toronto		Vancouver	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Males						
German	1.066		1.072		0.996	
Greek	0.648	***	0.798	***	0.690	**
Italian	0.975		0.912	**	0.881	
Polish	0.939		0.850	**	0.781	
Portuguese	1.028		0.881	**	0.833	
Spanish	0.700	***	0.758	***	0.724	***
Ukrainian	1.219		0.989		0.823	
Arab	0.648	***	0.603	***	0.716	
Hindi	0.986		0.868		0.980	
Punjabi	1.361		0.706	***	0.763	**
Chinese	1.197		0.990		1.097	
Tagalog	1.070		0.933		0.867	
Vietnamese	1.074		0.852		0.727	**
Neither E/F	0.750	***	0.710	***	0.737	***
Females						
German	0.935		0.970		0.931	
Greek	0.709	***	0.934		0.969	
Italian	0.956		0.930	*	0.812	**
Polish	0.844		1.063		1.047	
Portuguese	1.075		1.016		1.230	
Spanish	0.804	***	0.743	***	0.898	
Ukrainian	0.883		1.029		0.937	
Arab	0.600	***	0.533	***	0.854	
Hindi	1.250		0.850		0.871	
Punjabi	1.561	*	0.737	***	0.713	***
Chinese	1.552	**	1.045		1.232	**
Tagalog	2.136	***	1.419	***	1.559	***
Vietnamese	1.505	**	0.696	***	0.808	
Neither E/F	0.842	**	0.726	***	0.748	***

Source: 1991 Census of Canada individual file, population 20-64 not in school full time.
Selection: Population whose primary source of income is wages and salaries
Significance: *: 0.1 level; **: 0.05 level; ***: 0.01 level
Note: Coefficients are reported for persons who speak one non-official language or less.

Table 4b shows selected conditional odds from logit regressions analogous to those in Table 4a. The dependent variable is a FTFY flag, and the independent variables are controls for place of birth, ethnicity, household type, education, potential experience. The estimates reported show the expected differences in FTFY work probabilities for men and women who differ in their particular non-official language knowledge, but are otherwise identical.

Among men, we see a similar pattern to that in Table 4a, with Greek and Spanish speakers having significantly lower probabilities of FTFY work in all three CMAs. In addition, Toronto men who speak Polish, Italian and Portuguese all have lower probabilities of having FTFY work than English unilinguals. Men in the other language groups have about the same probability of being in FTFY work as the control group.

For women, the story is very different. A number of what could be considered "non-European" language groups actually show higher probabilities of FTFY work which are statistically significant. Thus, women living in Montreal who speak Punjabi, Tagalog, Chinese or Vietnamese actually have a higher probability of being engaged in FTFY work than is the case for unilingual anglophone women. The same is true for Tagalog speaking women in Toronto and Tagalog or Chinese speaking women in Vancouver.

A number of other language groups face statistically significant penalties. Unlike the case for men, however, there is no group that faces a penalty is all three CMAs. Thus, Spanish speaking women living in Montreal and Toronto exhibit lower conditional odds of being in FTFY work, but this is not the case for Spanish speaking women in Vancouver. Italian speaking women in Toronto and Vancouver face lower probabilities of FTFY work, but not Italian speaking women in Montreal.

4. CONCLUSION

In this paper we look at the return to language knowledge, controlling both for the languages learned, and the paths by which language knowledge was attained. We started out by looking at official language knowledge and found that the returns to language knowledge are quite different across CMAs. However, in all CMAs, knowing an official language is better than not knowing an official language, and often, being official language bilingual is better than being unilingual in English or French. However, overall, it is apparent that the market for language knowledge is local. Thus, what may pay in one CMA may not pay in another, even if that language is the other official language.

We also explored the economic returns of languages known by mother tongue versus languages learned later in life and found that mother tongue language knowledge is correlated with poorer labour market outcomes in comparison with learned language. This finding suggests that the true return to official and non-official language knowledge, unpolluted by unobserved variable bias, is somewhere between the two returns.

Finally we looked at the economic returns to the 13 largest non-official languages spoken in the three CMAs. We were surprised to find that non-official language knowledge rarely improves labour market outcomes. This is, in part, a reflection of the fact that the vast majority of the people who speak non-official languages are part of the ethnic language community. Thus we may be measuring a cultural attribute rather than a direct penalty. However, the fact that the penalties remained even after extensive controls for immigrant status suggests that there may be something else going on. Such wage differences could, for example, be indicative of labour market discrimination. If employers discriminate or pay differentially based on cultural characteristics, perhaps they are using language knowledge and accent as a marker for defining "the other". It is also possible that language knowledge is indicative of some other cultural trait which employers identify, such as family name. Thus language knowledge may be indicative of a much broader cultural trait.

The wage differences could also be indicative of something less sinister. If language knowledge is not viewed as a piece of human capital, and instead is viewed as a consumer good, then perhaps the differences we witnessed for non-official languages and even the official languages in Vancouver and Toronto, are simply a product of the fact that Canadians do not learn an additional language to earn money—they do it because they want to.

This conclusion, albeit surprising, is somewhat disheartening for two reasons. First if one believes that language knowledge is a skill and therefore marketable, it suggests that a piece of human capital is being wasted. It appears that in a broad sense, the Canadian labour market simply does not value language knowledge and the possibilities such knowledge brings. Second, and possibly worse, it appears that being part of a language community may actually hurt employment opportunities. Thus, rather than merely being neutral, the ability to speak an non-official language, acts as "reverse human capital" and appears to have a real effect on both wages and employment opportunities.

BIBLIOGRAPHY

Akbari, A. *Economics of Immigration and Racial Discrimination: A Literature Survey (1970–1989)*. Ottawa: Multiculturalism and Citizenship Canada, 1992.

Bloom, D.E. and G. Grenier. "Earnings of the French Minority in Canada and the Spanish Minority in the United States", in B.R. Chiswick (ed.) *Immigration, Language and Ethnicity: Canada and the United States*. Washington, D.C.: The AEI Press, 1992.

Breton, A. *Bilingualism: An Economic Approach*. Montreal: C.D. Howe Institute, 1978.

Christofides, L. and R. Swidinsky. *Bilingualism and Earnings: A Study based on 1971, 1981 and 1991 Census Data*. Ottawa: Official Languages Branch, Department of Canadian Heritage, 1997.

Christofides, L. and R. Swidinsky. "Wage Determination by Gender and Visible Minority Status: Evidence from the 1989 LAMAS". *Canadian Public Policy*, Vol. 20, No. 1, 1994, 34–51.

Evans, M. and J. Kelley. "Immigrants' Work: Equality and Discrimination in the Australian Labour Market". *Australian and New Zealand Journal of Sociology*, Vol. 22, No. 2, 1986, 187–207.

Fenwick, R. "Ethnic Culture and Economic Structure: Determinants of English-French Earnings Inequality in Quebec". *Social Forces*, Vol. 61, No. 1, 1982, 1–23.

Harrison, B. *Measures of Mother Tongue Vitality for Non-Official Languages in Canada (1986)*. Ottawa: Policy and Research, Multiculturalism and Citizenship Canada, 1990.

Kralt, J. and R. Pendakur. *Ethnicity, Immigration and Language Shift*. Ottawa: Policy and Research, Multiculturalism and Citizenship Canada, 1991.

Lachapelle. "Evolution of Language Groups and the Official Language Situation in Canada". Paper presented at the Annual Meeting of the American Sociological Association, 1989.

McAndrew, M. and P. Lamarre. "The Integration of Ethnic Minority Students Fifteen Years after Bill 101: Some Issues Confronting Montreal's French Language Public Schools". *Canadian Ethnic Studies*, Vol. 28, No. 2, 1996.

Pendakur, R. *Speaking in Tongues: Heritage Language Maintenance and Transfer in Canada*. Ottawa: Policy and Research, Multiculturalism Sector, 1990.

Pendakur, K. and R. Pendakur. "Colour of Money: Earnings Differentials among Ethnic Groups in Canada". Ottawa and SFU: Strategic Research Analysis, Canadian Heritage, RIIM Working Paper, 1997.

Shapiro, D.M. and M. Stelcner. "Language and Earnings in Quebec: Trends over Twenty Years, 1970-1990". *Canadian Public Policy*, Vol. 23, No. 2, 1997, 115–140.

Shapiro, D.M. and M. Stelcner. "The Persistence of the Male-Female Earnings Gap in Canada, 1970-1980: The Impact of Equal Pay Laws and Language Policies". *Canadian Public Policy*, Vol. 13, No. 4, 1987, 462–476.

Vaillancourt, F. "An Economic Perspective on Language and Public Policy in Canada and the United States", in B.R. Chiswick (ed.) *Immigration, Language and Ethnicity: Canada and the United States*. Washington, D.C.: The AEI Press, 1992.

4. BILINGUALISM AND EARNINGS: A STUDY BASED ON 1971, 1981 AND 1991 CENSUS DATA

Louis. N. Christofides
Department of Economics
University of Guelph

Robert Swidinsky
Department of Economics
University of Guelph

1. INTRODUCTION

Canada is a multicultural country with two official national languages, English and French. In 1991, the majority of Canadians, 67.1 percent, spoke English as their sole official language, 15.2 percent spoke only French, 1.4 percent spoke neither English nor French, and 16.3 percent spoke both official languages. This latter group has increased marginally since 1971 (from 13.4 to 16.3 percent), possibly in response to the *Official Languages Act* in 1969[1], but its distribution across the country is highly skewed. In Quebec, 35.4 percent of the population is fluent in both English and French. Outside Quebec, only 9.8 percent of the population is bilingual. English is the majority language in the country, however, in Quebec French is the majority language. Nonetheless, English is the unchallenged lingua franca. It is the language that dominates commercial, cultural and political activities in North America.

---

[1] For a chronology of provincial and federal legislation concerned with language see Vaillancourt (1992).

Some Canadians are bilingual naturally because of dual English-French mother tongues[2], but for the vast majority bilingualism is an acquired language trait. The wage effects of acquiring dominant language skills have been well documented (for example, see Rivera-Batiz, 1990), but the wage advantages of acquiring secondary language skills, such as English in Quebec and French outside Quebec in a country that is officially bilingual, are less well defined. Breton (1978) has argued that the acquisition of secondary language skills is an investment in human capital similar to acquiring more schooling or skill training. Ignoring cultural benefits, the yield on this investment depends on the costs of learning the language and the role of the acquired language in consumption, distribution and production activities. However, returns to an investment in English or French language skills need not be symmetrical. Rather, they will depend on the dominance of the acquired language in economic activities. Breton and Mieszkowski (1977) have shown, using the analogy of a small country-large country trade model, that the returns to bilingualism should be higher for the French than the English. The implication of this observation is that relatively few English-speakers, even in Quebec, will learn French. The opposite holds for French-speakers. Policies encouraging French language use in Quebec may redistribute earnings between linguistic groups within the province, but they may also reduce the welfare of the English linguistic group without necessarily improving the welfare of the French linguistic majority.

A number of studies in Canada by, for example, Bloom and Grenier (1992), Vaillancourt (1992), Robinson (1988), Chiswick and Miller (1992), Shapiro and Stelcner (1987) and Grenier (1987) have attempted to estimate the economic value of different official language skills using various time periods, regions, data sets, and measures of language fluency.[3] In general, they fail to find strong language effects on earnings outside Quebec. In Quebec, fluency in only the French language is associated with lower labour market earnings, but this negative earnings effect has become significantly weaker since the 1970's. The returns to bilingualism are generally positive.

[2] In 1991 fewer than .5 percent of the individuals in our sample for Quebec were bilingual because of dual mother tongues. The comparable statistic for Canada, excluding Quebec, was less than .25 percent.

[3] For a summary of Canadian and United States studies, see Bloom and Grenier (1992).

In this paper we provide detailed Ordinary Least Squares and selectivity-corrected estimates of the effects of language skills on annual earnings, using data from the three census years, 1971, 1981 and 1991. Earnings are but one dimension of the labour market that language skills may affect. Language skills may also have an effect on occupational choice, job training, job opportunity, promotion and other labour market outcomes. However, the focus of this study is the changing wage effect of proficiency in Canada's two official languages, English and French, over the twenty year period 1971–91. We provide OLS estimates of the returns to bilingualism for each census year by gender, region, age group, education, occupation, and industry. We also estimate the wage effects of bilingualism under the assumption that the acquisition of bilingual language skills is endogenous.

Our results show that, relative to the earnings of unilingual Anglophones, the returns to bilingualism have increased significantly between 1971 and 1991 in both Quebec and the Rest-of-Canada, although they are considerably higher in Quebec. Moreover, these returns accrue to both Anglophone and Francophone bilinguals. However, unilingual and bilingual Anglophone men in Quebec have experienced a significant decline in earnings relative to Francophones in Quebec and Anglophones in the Rest-of-Canada. There is little evidence of a strong, systematic pattern in the returns to bilingualism when the data is analyzed by age, education, occupation or industry groupings.

The following section provides a theoretical framework for the econometric analysis. Section 3 contains a description of the data, and Sections 4 and 5 present the regression results. Section 4 contains detailed Ordinary Least Squares (OLS) regressions while Section 5 contains selectivity corrected regression results. The final section contains a summary of our findings.

2. THEORETICAL FRAMEWORK

Consider, as in Bloom and Grenier (1992), a local economy with two language communities, French and English, and two corresponding labour markets. Each market is characterized by a supply-demand framework, with the wage rate and the quantity of labour as the defining price-quantity variables. Workers in both markets are identical, except for language skills. Some workers speak only French, some only English, but some are fully bilingual and can function in both labour markets. Fluency in only one language is determined exogenously by mother tongue, but bilingualism is an acquired language attribute that is endogenous to labour market conditions. Given that the acquisition of a second language is costly, workers whose mother tongue is English will learn French only if wage differentials in the two language markets are sufficient to provide a competitive rate of return. Similarly, workers whose mother tongue is French will become bilingual if learning English enables them to work in the English labour market where wages are higher. This assumption need not rule out the possibility that language skills may be acquired exogenously through, for example, the educational system.

The supply of workers in each local labour market will depend on the population of each mother-tongue group and on the number of individuals with the other mother tongue who are bilingual. Bilinguals can supply labour in either the English-language or French-language markets. Shifts in supply can result from natural increases in population, from an increase in the number of individuals who are bilingual, or from migration into or out of the local labour market by individuals with similar language skills.

Assume, as in Vaillancourt (1992), that the demand for labour in each local labour market is dependent on 1) the language of the product markets served by employers, 2) the language of the existing instruments of work (technology, instructions, etc), and 3) the language of the owners of the firms. When the products produced are standardized or impersonal, the language of the product market is generally irrelevant, since consumption does not intimately involve communications. However, for personal products the identity of the producer is relevant since the value of the service to consumers may depend on the producer's ability to communicate with them (McManus, 1985). In this case, the language of work will be important, and the demand for labour will reflect the size of the product market served by employees. Thus, the larger the market serving unilingual French, the greater the demand for employees who are proficient in French.

In production, language becomes a significant factor if the evolving technology requires knowledge of the more technologically advanced language (McManus, 1985). For example, if most computer programs are written in English, the demand for workers proficient in English will be higher than would otherwise be the case. Similarly, firms that conduct business outside their local product market will require workers who could communicate in other languages, primarily English. Breton and Mieszkowski (1977) show that firms are more likely to use the dominant language in transactions involving both linguistic markets. Given the relative size of the English and French-language market in Canada and in North America, employers are more likely to require fluency in English. This implies that Francophones are more likely to be bilingual than Anglophones, even in Quebec.

Finally, the language of owners and managers of firms will determine labour demand in each linguistic labour market. In the hierarchy of decision-making, owners and managers will have a preference for subordinates with whom they can communicate without intermediaries. Only when tasks are menial, requiring very limited verbal communication, will owners and managers be indifferent as to the language of their workers.

The configuration of labour supply and demand in the two language labour markets will determine the language-wage differential. Varying the demand or supply of workers in the two markets will alter the relative wages of the two language groups. Suppose, as in Quebec, authorities attempt to elevate the status of one linguistic group by using demand-side policies, such as requiring that French be the language of work. The effect of this policy would be to increase demand in the French-language labour market and reduce it in the English-language labour market. The initial effect is to reduce the wage differential between English and French-speaking workers. This may prompt some English-speaking workers to invest in language training in order to compete in the French-language market. Similarly, bilinguals who previously worked in the English-language market may shift to the French market. If the movements are significant, the language-wage differential may be reduced, eliminated, or even reversed.

While wages in the French-language market may increase, those in the English-language market may decrease. The reduction in wages, coupled with a corresponding loss in social and cultural status, may encourage English-speaking workers to migrate to other English-speaking labour markets outside Quebec. This migration will further erode demand for English-language workers since it reduces the number of English-language consumers. Furthermore, firms that previously minimized costs by operating in English may be tempted to move their operation outside the province, reducing the demand for all labour. This is particularly true for firms that conduct much of their business with English-speaking firms outside Quebec. If this exodus is sufficiently large, wages in both labour markets will be affected. Thus while the wages of French-speaking workers may increase relative to those of English-speaking workers in Quebec, the wages of both groups may ultimately fall relative to those outside Quebec.

3. DATA

Data for this study are obtained from the individual files of the Public Use Sample Tapes from the 1971, 1981 and 1991 Censuses. To construct the working samples for each census year we retain observations only if the individual is 15–64 years of age, is Canadian born, is a paid or self-employed worker, has positive earnings and weeks of work, did not attend an educational institution either full or part-time in the year preceding the census, has an English or French (but not both) mother tongue, and claims fluency in one, or both, official languages (English, French, or both English and French). Individuals with dual English-French mother tongues are excluded because the focus of this study is the economic returns to the acquisition of a second official language.[4]

As Table 1a indicates, the above restrictions yield working samples of 55,772 observations for 1971, 150,164 observations for 1981, and 283,875 observations for 1991. Table 1a also gives the composition of the working samples by census year, gender, region (Canada, Quebec, Rest-of-Canada)[5], and linguistic group. Individuals are divided into four linguistic groups based on mother tongue and official language: (1) English mother tongue and English official language (Unil eng), (2) English mother tongue and both official languages (Bil eng), (3) French mother tongue and French official language (Unil fr), and (4) French mother tongue and both official languages (Bil fr).

---

[4] Individuals whose mother tongue is a heritage language are also excluded because, for those who are bilingual, it is not obvious whether the investment was made in the English or French language.

[5] Rest-of-Canada refers to all provinces other than Quebec.

In Canada, in 1971, 60.79 percent of all males in the sample were English unilingual, 4.59 percent were English bilingual, 16.82 percent were French unilingual and 17.80 percent were French bilingual. By 1991, the proportion of English unilinguals and English bilinguals had increased to 63.84 and 4.96 percent, respectively. The proportion of French unilinguals and French bilinguals had declined to 14.98 and 16.23 percent, respectively.

Outside Quebec, the proportion of English unilingual males is considerably higher, the proportion of English bilingual males marginally lower, and the proportions of French unilinguals and French bilingual males substantially smaller. However, the variations in these proportions over time are similar to those for the entire country. In Quebec the patterns are reversed. In 1971, English unilingual and bilingual males represented 5.28 and 6.43 percent of our sample, respectively. By 1991, these proportions had declined to 2.02 and 5.59 percent, respectively. During this twenty year period the proportion of French unilinguals increased marginally from 49.96 to 50.87 percent, while the proportion of French bilinguals increased from 38.33 to 41.51 percent. The regional proportions of the four linguistic groups, and their changes over time, are very similar for females. The only difference is that the percentage of unilingual English women outside Quebec declined slightly from 88.89 to 87.71 percent.

Table 1b shows the earnings profile by region and linguistic group in 1971, 1981 and 1991. Outside Quebec, English bilingual males have the highest average annual earnings. French bilingual males generally earn marginally less than English unilingual workers, while French unilingual males have the lowest average annual earnings. In 1971, in Quebec, English bilingual males earned substantially more than French bilingual males ($9,514 compared to $7,786), while French unilingual males were the lowest paid ($5,403). English unilingual males had the second highest average annual earnings ($8,762). In

1991, English bilingual males still had the highest average annual earnings ($36,534), but the earnings of French bilingual males were virtually identical ($36,319). The earnings of French unilinguals ($26,493) were 72.9 percent of the earnings of French bilinguals, an increase from 69.4 percent in 1971. The average annual earnings of English unilingual males were considerably lower ($30,169) than the earnings of bilingual males.

In 1971, English unilinguals in Quebec earned 17.2 percent more than English unilinguals outside Quebec. By 1991, however, English unilinguals in the Rest-of-Canada earned 10.1 percent more than English unilinguals in Quebec. This reversal is almost as dramatic for English bilinguals. In 1971, English bilinguals in Quebec earned 4.0 percent more than English bilinguals outside Quebec. By 1991, they earned 13.0 percent less than English bilinguals in the Rest-of-Canada. The average annual earnings of French unilinguals and bilinguals were higher in Quebec than in the Rest-of-Canada in all three census years.

The pattern of average annual earnings for females differentiated by linguistic group is very similar to that for males, with the exception that French bilingual women were the highest paid group in Quebec in 1971 and 1981. As well, the average annual earnings of English unilingual women in Quebec are consistently higher than the earnings of English unilingual women in the Rest-of-Canada.

4. OLS REGRESSION RESULTS

In this section, the economic returns to language skills are estimated using intercept-shift dummy variables to represent linguistic categories within an Ordinary Least Squares framework. OLS earnings equations are estimated separately for the three census years, 1971, 1981 and 1991, and, within each year, separate equations are estimated by gender, region, age group, education, occupation, and industry. The results derived from these estimated equations will yield a preliminary profile of the returns to an investment in a second official language and suggest the direction for more exacting analysis.

The log-earnings OLS equations take the form (subscripts for individuals are suppressed):

$$\ln E = L + ßX + u \qquad (1)$$

where ln E is the natural log of annual earnings[6], L is a column vector of linguistic attributes, is a row vector of corresponding coefficients, X is a column vector of productivity-related control variables, ß is a row vector of corresponding coefficients, and u is an error term. The set of linguistic variables includes Unil eng, Bil eng, Unil fr and Bil fr, with Unil eng serving as the comparison group. The earnings model controls for work experience, region, urban-rural location, marital status, schooling, vocational training, class of worker, weeks worked, full-time/part-time status, industry and occupation. These explanatory variables are fairly standard and have been included in earnings equations in several earlier studies employing census data.[7]

4a. Total Sample Results

Table 2 gives the estimated earnings equations for the total sample of paid and self-employed male workers for 1971, 1981 and 1991. Table 3 gives the estimated earnings equations for all females. The overall fit of each reported earnings equation is very good, given the micro nature of the data, with the adjusted R2 ranging from .427 in the 1991 male equation to .621 in the 1971 female equation. The estimated coefficients have, with rare exception, the expected signs and are generally significant at the 5 percent level.

Concentrating first on the male sample results, annual earnings in Ontario are higher than in other regions of Canada, except in 1981 when earnings in Quebec and the western region (Alberta and British Columbia) were higher. Labour market experience has a positive, but nonlinear, effect on earnings in all three census years, with annual earnings peaking at 19 years of experience in 1971, 17 years in 1981 and 16 years in 1991. Males who reside in major urban centres earn

[6] The options available for the dependent variable are total annual earnings and annual earnings of full-year, full-time workers. Average weekly and hourly earnings are not options because actual weeks worked are not available for 1971, and hours worked are available only for the week of the census in all three years. We use the total annual earnings specification to avoid losing a large number of observations.

[7] See, for example, Shapiro and Stelcner (1987); Bloom and Grenier (1992) and Bloom, Grenier and Gunderson (1995). The precise definitions of the variables are given in the Appendix.

significantly more than males residing in smaller centres or in rural areas. Males who are heads of households earn significantly more while male children and relatives of the household heads earn significantly less than unrelated males. The Married and Other (divorced, separated, widowed) marital status categories are associated with higher annual earnings for males in all three census years but married males have higher annual earnings.

Years of formal schooling have a positive and increasing effect on male earnings. In 1971, the tenth year of schooling would raise annual earnings by 5.4 percent, while the fifteenth year would raise annual earnings by 8.4 percent.[8] The comparable effects are 3.1 and 5.1 percent, respectively, in 1981 and 4.7 and 5.7 percent, respectively, in 1991. Skill training increases earnings by amounts which range from 1.9 percent (1981 results) to 4.7 percent (1971 results). Non-labour income has a negative and significant effect on annual earnings in 1991, while weeks worked and full-time status have strong positive effects on annual earnings in all three years. The earnings of the self-employed are significantly lower than the earnings of paid workers. Although the pattern changes from 1971 to 1991, in general, male earnings tend to be highest in the mining, manufacturing, construction, transportation, utilities and public sector industries.[9] As expected, managers, professionals in the natural sciences and teachers have the highest annual earnings, while males in the service occupations have the lowest earnings.

Focusing on the language variables in the 1971 equation, the French unilingual coefficient is negative and significant, but neither the English bilingual nor French bilingual coefficients are significant. These results imply that the acquisition of a second official language by an Anglophone male did not provide any economic return. However, the acquisition of a second official language by a

---

[8] There may also be threshold effects associated with, for example, a high school certificate or an university degree; see Shapiro and Stelcner (1987). We ignore these potential effects since the 1971 data does not identify individuals who achieved a high school certificate. We also note that, because most of the coefficients discussed in the text are small, their interpretation does not require the Halvorsen and Palmquist (1980) adjustment.

[9] Because of space constraints, the estimated industry and occupation coefficients are not reported in the tables.

Francophone generated a 5.9 percent increase in annual earnings. In the 1981 equation, however, both bilingual variables have positive and significant coefficients. The French unilingual coefficient is negative but not statistically significant at the 5 percent level. By 1981, knowledge of a second official language increases the annual earnings of both Anglophones and Francophones by 3.0 and 1.8 percent, respectively. The 1991 equation suggests that the returns to bilingualism for both Anglophones and Francophones (2.4 and 3.2 percent respectively) are significantly different from zero and that the earnings of unilingual Anglophones and Francophones are not substantially different from each other.

The female regressions yield similar results, but there are several noteworthy differences. In the 1981 equation, females household heads have lower annual earnings, married status is not a significant factor in the 1971 and 1991 equations, job training has a negative but insignificant effect on earnings in 1981 and 1991, and other income has a positive and significant effect in 1981. The estimated language coefficients are almost identical to those derived from the male equations, with two exceptions: (i) bilingual Francophone females in 1971 had significantly higher annual earnings than Anglophone or unilingual Francophone females and (ii) in 1991, bilingual Anglophone women had the highest annual earnings.

4b. Results by Region

Separate earnings equations are estimated for each census year for males and females disaggregated into eight regions. Province of Quebec, Montreal, Rest-of-Quebec, Rest-of-Canada, New Brunswick, Ontario, Rest-of-Ontario (excluding Ottawa-Hull), and all other provinces (other than Ontario, Quebec, and New Brunswick). Given the high proportion of non-Francophones residing in Montreal, we examine the hypothesis that the returns to bilingualism may be different in Montreal than in the rest of the province. The returns to bilingualism in Ontario and New Brunswick, because these provinces are contiguous with Quebec and have relatively large populations of Francophones, may be higher than in provinces that are more distant from Quebec and have relatively small populations of Francophones. Within Ontario, we estimate the returns to bilingualism outside the national capital region where the effect of the federal government policy of official bilingualism on earnings may be particularly pervasive.

Since our primary interest is the effect of language skills on earnings, only the estimated coefficients and corresponding t-statistics for the three official language variables are reported in Table 4. The control variables generally perform as in the overall equations given in Tables 3 and 4, and need no further discussion. Focusing first on the male results, in Quebec, in 1971, the annual earnings of French unilinguals were 10.2 percent lower than the earnings of the English unilingual control group. The English bilingual coefficient is positive but not significant; the French bilingual coefficient is negative but also not significant. In the 1991 estimates, however, both bilingual language coefficients are positive and statistically significant at the 5 percent level. The French unilingual coefficient is positive but not significant. English bilingual males earned 9.3 percent more, and French bilingual males 10.5 percent more, than English unilingual males. The coefficient estimates are very similar for Montreal. However, by 1991, in the Quebec region outside the Montreal CMA, bilingualism yields a significant earnings premium (13.3 percent) only for Francophones.[10]

In the Rest-of-Canada, bilingual language skills do not appear to have had a significant effect on male earnings in 1971. In 1981, however, English bilinguals earned 3.0 percent more than the English unilingual comparison group. By 1991, the annual earnings of English and French bilingual males were 2.2 and 2.4 percent, respectively, higher than the annual earnings of English unilingual males, but this result has only limited support in the more detailed regional estimates. Bilingual language skills are correlated with annual earnings only in Ontario and New Brunswick. The estimated language coefficients for the other provinces are not statistically significant. In New Brunswick in 1991 French unilinguals earned 8.6 percent less than Anglophones or French bilinguals. In 1991, bilingual Anglophones in Ontario earned 3.0 percent more than other linguistic groups. Outside the Ottawa-Hull CMA Anglophones who had the ability to communicate in both official languages earned 3.4 percent more annually than Anglophones who were unilingual.

---

[10] In 1971, the Montreal data are not a subset of the Quebec data. Thus we cannot estimate an earnings equation for the Rest-of-Quebec for that census year.

In general, language skills do not appear to be significant determinants of the annual earnings of females in Quebec. Outside Quebec, the returns to official language skills generally follow the same pattern established for males. However, the estimated language coefficients show that the returns to bilingualism, where they exist, are larger for females than for males. Moreover, in New Brunswick in 1991, Francophone females received a 6.4 percent wage premium if they had English language skills.

4c. Interactive Results

The regional results discussed above show that, by 1991, the returns to bilingualism for both Anglophone and Francophone males in Quebec were substantially higher than the returns to bilingualism in the Rest-of-Canada. However, these estimates may be greatly overstated since they are based on a comparator group (unilingual English) whose earnings may have been adversely affected by the language laws enacted in Quebec during the 1970's and 1980's. As discussed in Section 2 above, the Quebec language laws may have increased the demand for workers fluent in the French language and decreased the demand for workers fluent in the English language. These adjustments may have increased the wages of unilingual Francophones and Anglophone and Francophone bilingual workers and lowered the wages of unilingual Anglophones. Selective out-migration of the latter group and the concomitant outflow of capital could exacerbate the decline in the earnings of unilingual Anglophones. Thus, the estimated relative gains in the annual earnings of bilinguals in Quebec may be more a reflection of the dwindling economic fortunes of the comparator group than an increase in the economic returns to official language skills.

To test for this possibility we estimate a single earnings equation for all regions in which the four language groups are interacted with the two regions (Quebec and Rest-of-Canada), with Unil eng*ROC serving as the comparison group. Table 5 gives the interactive language-region coefficients for males and females in each census year. In 1971 the annual earnings of unilingual Anglophone males in Quebec and bilingual Anglophone males in and outside Quebec were not significantly different from the annual earnings of unilingual Anglophone males outside Quebec. However, the annual earnings of both unilingual and bilingual Francophones in Quebec were significantly lower (9.4 and 5.4 percent, respectively) than the earnings of the comparison group. By 1991, the effect of language skills on earnings had changed substantially. Unilingual Anglophones in Quebec earned 13.6 percent less than unilingual Anglophones in the Rest-of-Canada. Bilingual Anglophones in Quebec earned 5.8 percent less but bilingual Anglophones outside Quebec earned 2.7 percent more. Bilingual Francophones in the Rest-of-Canada also earned more (2.0 percent) than the comparison group, but unilingual and bilingual Francophones in Quebec continued to earn less (8.6 and 3.9 percent, respectively) than the comparison group of unilingual Anglophones in the Rest-of-Canada. Viewed from this perspective, the 1991 returns to bilingualism in Quebec are more modest than reported in Table 4. Among Anglophones, bilingualism increases earnings by an estimated 7.8 percent (0.136–0.058), while among Francophones the gain in earnings is a more modest 4.7 percent (0.086-0.039). Relative to unilingual Anglophones outside Quebec, the position of both unilingual and bilingual Francophones has improved marginally, but the position of Anglophones, and especially unilingual Anglophones, has declined dramatically. However, from a within-Quebec point of view (as in Table 4), the gains in relative earnings, using unilingual Anglophones as a comparison group, appear to have been very substantial.

In 1971, only unilingual Francophone women in Quebec had significantly lower annual earnings (5.9 percent) than unilingual Anglophone women in the rest of Canada. However, bilingual Francophone women outside Quebec earned 7.0 percent more than the comparison group. By 1991, the wage gains for this latter group declined to 2.4 percent, but bilingual Anglophone women outside Quebec also had significantly higher annual earnings (4.6 percent). Unilingual Francophone women in Quebec continued to earn significantly less (6.6 percent) than unilingual Anglophones in the rest of Canada. These results suggest that the ability to speak both official languages did not increase the earnings of women in Quebec over time, though it did continue to confer an earnings advantage to women outside Quebec until 1991. However, the inability to communicate in English had a significant and increasing, negative, effect on female earnings in Quebec.

4d. Results by Age

Language policy may have different effects on older and younger workers. Younger workers may be more adaptable to a new language environment, and they may replace older workers in jobs that now reward knowledge of both official languages. Table 6 presents evidence on returns to language skills by sex and age groups 15–29, 30–49 and 50–64 for Quebec and the Rest-of-Canada. Outside Quebec (Table 6b) there is no discernible age pattern to returns to language skills. There is some evidence that younger Francophone males earn more if they learn English. Older Anglophone males and younger Anglophone females earn more if they learn French.

In Quebec, however, the returns (Table 6a) to language skills are concentrated among males aged 15–29 and 30–49 years. Younger bilingual Anglophones earned 10 to 14 percent more than unilingual Anglophones in all three census years. The annual earnings of younger bilingual Francophones were not significantly different than the earnings of unilingual Anglophones in 1971, but they were 8.8 percent higher in 1981 and 17.3 percent higher in 1991. However, by 1991 younger unilingual Francophones earned 10.9 percent more than the control group of English unilingual males. These results imply a return to bilingualism among younger Francophones of 6.4 percent (17.3–10.9 percent).

In 1971, although both unilingual and bilingual Quebec Francophone males aged 30–49 years earned less than unilingual Anglophones, bilingualism increased the earnings of Francophones by 10 percent (–0.077–(–0.177)). By 1991, both Francophone groups earned more than unilingual Anglophones. However, the annual earnings of bilingual Francophones were 6.8 percent higher than the annual earnings of unilingual Francophones. The returns to bilingualism were higher among Anglophones. Those who learned French had their annual earnings increase by 11.3 percent. There is no statistical evidence that bilingualism has an effect on the earnings of older male workers. Similarly, there is no evident age pattern in the returns to bilingualism among women in Quebec.

4e. Results by Education

Separate earnings equations are estimated for three educational categories: Elementary (grades 0–8), High School (grades 9–13, high school certificate and vocational training), University (some university, undergraduate and graduate degree). The estimated language coefficients, presented in Table 7, do not display a strong, systematic relationship between schooling and returns to bilingualism. Outside Quebec (Table 7b) bilingual Francophone males with elementary schooling tended to have higher annual earnings in all three years. Bilingual Francophone males with high school schooling earned significantly more in 1991, while bilingual Anglophone males with university schooling earned significantly more in 1981 and 1991. With the exception of Francophones with high school and university education in 1971 and Anglophones with university education in 1991, there appear to be no significant returns to bilingual language skills among females categorized by schooling in the Rest-of-Canada.

In Quebec (Table 7a) the effects of schooling on the economic returns to bilingualism are more pervasive. Among males with an elementary education bilingual Anglophones had significantly higher annual earnings than any other linguistic group in all three census years. Among males in the high school category, bilingual Francophones earned 6.5 percent more than unilingual Francophones in 1971 and 6.2 percent more in 1991. Bilingual Anglophone males with high school education earned 10.1 percent more than unilingual Anglophones in 1991. At the university level, earnings do not appear to be correlated with bilingual language skills. However, the earnings of university-educated males who lack English language skills are substantially lower in all three census years.

In general, bilingual language skills do not significantly improve the labour market earnings of females in Quebec who have an elementary or high school education. Among university educated females in Quebec, bilingual Anglophones earned 13.6 percent more than unilingual Anglophones in 1991, while bilingual Francophone females earned 15.0 percent more in 1981 and 11.2 percent more in 1991 than unilingual Anglophones; these differences are statistically significant at the 5 percent level.

4f. Results by Occupation

Separate equations are estimated for three occupational groups: Managerial/Professional, White collar and Blue collar. Except in 1991 among Anglophones, bilingualism is not a significant factor in the annual earnings of managers or white collar workers outside Quebec—see Table 8b. In 1991, knowledge of the French language increased the earnings of Anglophone male managers and professionals by an estimated 3.4 percent. For females the increase was 4.9 percent. In 1971 and 1981, the earnings of female managers and professionals who were unilingual French were significantly lower than the earnings of other linguistic groups. In the blue collar occupations in the Rest-of-Canada, bilingualism had significant economic advantages for Francophone males in all three census years.

In the earnings equations for Quebec (Table 8a), the estimated language coefficients also fail to show a strong, distinct pattern in the relationship between earnings, language, and education. Among managerial/professional males, bilingualism did not confer a significant economic advantage until 1991, when bilingual Francophones earned 7.3 percent more than unilingual Anglophones. The earnings of unilingual Francophone males were significantly lower than those of the Anglophone comparison group in 1971 and 1981 However, by 1991, being unilingual was not a significant disadvantage for Francophone male managers/professionals. With the exception of bilingual Francophone women in 1981, language skills appear not to be significant determinants of annual earnings of female managers/professionals.

Among white collar workers, unilingual Francophone men had significantly lower earnings in 1971 and unilingual Francophone women had significantly lower earnings in 1971 and 1981. However, this disadvantage based on language skills had disappeared by 1991. Language skills were not a significant factor in the annual earnings of blue collar males in 1971 or 1981, but in 1991 unilingual and bilingual Francophones earned 9.5 and 14.8 percent, respectively, more than unilingual Anglophones; language skills were not a determinant of earnings among blue collar female workers in 1991. It is noteworthy that bilingual blue collar workers did not earn significantly more than unilingual Anglophones in any census year.

4g. Results by Industry

Separate equations are estimated by sex and region for three industrial groups: goods producing industries (agriculture, other primary industries, manufacturing, construction, transportation and storage, utilities, undefined), finance/trade/service industries (finance, wholesale and retail trade, services, education, health), and the public sector (federal and provincial administration). The relevant language coefficients estimated from these equations are reported in Table 9.

In Quebec (Table 9a), language is correlated with earnings only for males in the goods producing sectors. In 1991, bilingual Anglophones in the goods producing sector earned 10.5 percent more than unilingual Anglophones, unilingual Francophones earned 10.5 percent more than the unilingual Anglophone comparison group, while bilingual Francophones earned 4.7 percent more than unilingual Francophones. The ability to communicate in both official languages was not an asset in the finance/service/trade sectors or in the public sector. Similarly, bilingualism was not a significant determinant of annual earnings among females in the goods producing, finance/trade/service or public sectors.

In general, in 1971, language was not a determinant of annual earnings outside Quebec. By 1991, however, language was a determinant of annual earnings for males in the goods producing and public sectors. Bilingual Anglophone males in the public sector earned 8.5 percent more than unilingual Anglophone males, while unilingual Francophones earned 25.9 percent less. In the goods-producing industries, bilingual Francophones earned 4.2 percent more than any other linguistic group. However, in these industries in 1991, unilingual Francophone females earned 14.9 percent less than other females. Bilingual females in the finance/trade/service sector earned roughly 4.4 percent more than unilingual females. In the public sector bilingual Anglophone females earned 7.6 percent more and bilingual Francophone females 5.1 percent more than unilingual females.

5. SELECTIVITY-CORRECTED RESULTS

In section 4, the variables of particular interest, namely Unil eng, Bil eng, Unil fr and Bil fr are constructed (see the Appendix) from information on the individual's mother tongue and declared fluency in one, or more, of Canada's official languages. Mother tongue is clearly exogenous but the same cannot be said for fluency in the second official language, which must be acquired. Indeed, the discussion in section 2 is predicated on the assumption that this is the case. Since the language variables in section four may be endogenous, the OLS results reported above may be biased and inconsistent.

In order to deal with this issue, a different econometric model is appropriate. As noted in footnote 2, only a negligible number of individuals are bilingual because of their mother tongue background. For the vast majority, bilingualism is an acquired trait. One approach is to specify separate log-earnings equations for bilingual and unilingual individuals which, following Heckman (1979), contain the appropriate inverse Mills ratios; the latter may be constructed from a background probit equation which explains the decision to become bilingual. The selection-adjusted log-earnings equations may control for the individual's mother tongue, an attribute which is clearly exogenous. This approach makes it possible to compare the earnings of bilingual and unilingual individuals and to consider how these are modified by the individual's mother tongue. Separate sets of equations may be estimated for each census year and gender.[11] In the remainder of this section, we describe results based on this approach.[12]

---

[11] Instead of the Heckman (1979) approach it is, in principle, possible to estimate, using Full Information Maximum Likelihood, a switching regressions model. This approach was plagued by convergence problems and was not pursued. The results in Tables 10 to 13b were obtained using LIMDEP 6.0.

[12] Only one other study appears to have addressed the issue of language endogeneity. Chiswick and Miller (1992) studied the earnings of immigrants who have knowledge of English or French relative to those who do not. They report weak evidence for the endogeneity of fluency in either of the official languages. However, in their sample of immigrants, only 3% are not fluent in either of the official languages and the size of this sample may make it difficult to study this issue conclusively. They obtained stronger evidence of language endogeneity in theUnited States, where a much larger proportion of immigrants (20%) do not speak English. Their results are obtained by instrumenting a categorical language proficiency variable using the linear probability method; the presence of children, whether married prior to arrival in Canada and the concentration of individuals with the same linguistic background in the region of residence are used as identifying instruments. They also use Lee's (1983) method which relies on the logit rather than the probit approach used in this paper to estimate selection-adjusted earnings equations; these appear to be based on the same identifying variables as the IV case.

Before turning to these findings, two points need to be addressed. The first concerns identification. The census data contains information which is not normally considered important in earnings functions; variables on the individual's religion, place of birth and ethnicity may be constructed and used for identification purposes—see the Appendix. These can be expected to influence the decision to acquire the other official language and are included in the probit but not the earnings equations. Second, it seems reasonable to exclude from the probit equation variables which pertain to the individual's actual type-of-work, e.g occupation and industry indicators, experience, prior training, whether self-employed, number of weeks worked and whether full or part-time. Instead of experience, the probit equation includes age. It should be noted that more inclusive probit equations led to similar results which are not reported. Since log-earnings do not appear in the probit equation, this part of the model may be thought of as reduced form in nature.

5a. The Determinants of Bilingualism

Probit equations for men and women describing the decision to become bilingual appear in Tables 10 and 11, respectively; in keeping with the underlying distributional assumptions, standard errors, rather than absolute t-statistics, are reported and coefficients which are statistically significant at the 5% level in two-tailed tests are indicated with an asterisk. The fit of these equations is very good in that they predict the correct outcome over 82% of the time.[13] The impact of individual variables on the probability of bilingualism, i.e. the "marginal effects", will be discussed in qualitative terms.[14]

---

[13] The sum of the diagonal elements in Tables 10 and 11 indicates the number of correct predictions and these, as a ratio to the number of observations N, constitute a useful descriptive statistic. For instance, in Table 10, in 1971, 25,744 males are correctly predicted to be unilingual and 4,028 males are correctly predicted to be bilingual. This sum as a ratio to N (29,772/36,105) equals 0.83. This ratio for 1981 and 1991 is also 0.83. In the case of females (Table 11), these ratios are 0.84, 0.83 and 0.82 for 1971, 1981, and 1991, respectively.

[14] In the probit model, the marginal effect of a continuous variable is given by the estimated coefficient for that variable times the value of the standard normal probability density function at the point of interest, normally the sample means. In the case of a dummy variable, the expected probability of bilingualism may be evaluated with and without the variable concerned.

In the case of men (Table 10), age increases the probability of bilingualism; for 1991, this effect is monotonic. The effect of schooling, the only other continuous variable, on the probability of bilingualism is positive, monotonic and, except for 1991, increasing. In comparison to unrelated individuals (the omitted category for household attributes) heads, children of the head and relatives are all less likely to be bilingual. However, heads are more likely to be bilingual than their children or relatives sharing their household. Urbanites are more likely to be bilingual in all census years. In comparison to individuals who have never married (i.e. the omitted category of "single"), separated, divorced or widowed individuals are more likely to be bilingual in 1971 and 1991; married individuals are more likely to be bilingual than single individuals but this effect is not significant at the 5 percent level.

The effects of region of residence, religion, region of birth and ethnicity are intertwined and it is interesting that the probit equations in Table 10 are able to establish separate effects for these factors. Presumably, this is due to the large number of observations that are available in the census data. In the case of ethnicity, the effects are very clear. Relative to individuals of other ethnic background, French are more and British and Europeans less likely to be bilingual. Individuals providing the response "Canadian" in the 1991 census, are less likely to be bilingual. Relative to individuals born in Ontario, those born in New Brunswick and Quebec are more likely than those born in other parts of the country to be bilingual. Relative to men of no religion, Protestants are less likely and those of other religions more likely to be bilingual; especially noteworthy is the substantially greater likelihood of Jews to be bilingual. The effects of region of residence are more complex. Relative to Ontario, the greater likelihood of bilingualism for residents of the Atlantic region is likely due to the prevalence of bilingualism in New Brunswick; the reduced likelihood of bilingualism among residents of other parts of the country in many census years is likely due to lower demand for the second official language, while the reduced likelihood of bilingualism in Quebec is probably due to the linguistic viability of Francophones in Quebec. In order to understand the effects of the conjunction of these attributes, it is helpful to think of stereotypical individuals and the likelihood that they will be bilingual given their assumed circumstances—the comparison group is individuals born and resident in Ontario who declare no religion and are not of British, French or European ethnic origin. Relative to individuals in the comparison group, a Catholic of French ethnic origins is more likely to be bilingual whether he lives in Quebec or not; however, if he does live in Quebec he is less likely to be bilingual than if he does not. A Protestant of British ethnic origin who was born and resides in the West is less likely to be bilingual than the control group. These effects appear reasonable both individually and in conjunction with each other.

The probit equations for women (Table 11) are generally similar to those for men. The most notable difference is that the coefficients on age change over time from the inverse U pattern of 1971 (men and women) and 1981 (men) to no pattern in the 1981 census and a U pattern in 1991. This change deserves further attention.

5b. Selection-Adjusted Log-Earnings Equations

To our knowledge, the probit equations in Table 10 and 11 are the first results on the determinants of bilingualism in Canada—the study by Chiswick and Miller (1992) was confined to the propensity of immigrants to acquire either official language. However, our probit results are also of value in that they make it possible to reconsider the OLS log-earnings equations of Tables 2 and 3, allowing for the endogeneity of fluency in the second official language. Tables 12a and 12b report the selection-adjusted log-earnings equation for bilingual and unilingual men, respectively. Tables 13a and 13b do so for bilingual and unilingual women, respectively. As already noted, these equations include the exogenous mother tongue indicator, thereby making it possible to distinguish the earnings outcomes of bilingual and unilingual men and women with French and English as their mother tongue.

The selection-adjustment is achieved by the inclusion of the appropriate inverse Mill's ratio Lamda in the log-earnings equations which, except for the exclusion of the three language variables, are identical to those in Tables 2 and 3. The inverse Mill's ratios are significant in four of the twelve equations reported in Tables 12a to 13b. In the case of bilingual men (Table 12a), the inverse Mill's ratio in the 1981 log-earnings equation has a coefficient (standard error) of –0.047 (0.015) while in the 1991 equation for unilingual men (Table

12b) it has a coefficient of 0.072 (0.017). In the case of women, significant coefficients for the inverse Mill's ratio are obtained only in the 1971 log-earnings equation with estimates of –0.119 (0.035) for bilinguals (Table 13a) and –0.136 (0.043) for unilinguals (Table 13b). Since the inverse Mill's ratios are positive for bilinguals and negative for unilinguals, the estimated coefficients suggest negative selection in all cases except for unilingual women in 1971. This latter group has unobservable characteristics which are associated with significantly higher rewards[15]; the opposite is true for the remaining three cases.

The estimated coefficients for the remaining variables in the log-earnings equations are similar to the OLS coefficients reported in Tables 2 and 3. They are also similar to the coefficients estimated in OLS earnings equations for bilinguals and unilinguals which exclude the inverse Mill's ratios and the language variables.[16] Accordingly, only the coefficients on the Mother Tongue French variable in the twelve OLS equations are reported in Table 14.

Because the selection adjustments are not significant in many of the estimated equations, the results on the earnings advantage of bilingualism and mother tongue presented in section 3 do not change substantially once sample selection is taken into account. The effects of the exogenous mother tongue variable for the earnings of bilingual and unilingual men and women are obtained from Tables 12a to 13b. In 1971, the French Mother Tongue variable has a negative coefficient in all four tables. For bilingual men and unilingual women, this effect is statistically significant and equal to 6.2 and 16.6 percentage points, respectively; the comparable effects in Tables 2 and 3, where language endogeneity was not taken into account, are 3.8 (the gap between the coefficients 0.025 and –0.013 in Table 2) and 6.1 (the coefficient on

---

[15] A very similar result for immigrants to the US who are not fluent in English is found in Chiswick and Miller (1992, 267).

[16] The coefficients on the Mother Tongue French variable in 12 (bilingualism, gender and year) OLS regression equations like those in Tables 12a to 13b but excluding the inverse Mill's ratios are reported in Table 14. These are similar to the corresponding coefficients in Tables 12a to 13b except in four cases. In 1971, the coefficient for unilingual males is negative and significant in Table 14 but it is not significant in Table 12b. In 1981, the negative coefficient for bilingual males is not significant in Table 14 but it is in Table 12a. In 1991, the positive and negative coefficients for unilingual men and women (respectively) are significant in Tables 12b and 13b but not in Table 14.

Unil Fr in Table 3), respectively, effects which are substantially smaller. By 1981, the French Mother Tongue disadvantage for bilingual males shrinks to 4.6 percentage points (relative to 1.2 percentage points in Table 2) but it is still statistically significant. However, none of the other coefficients are statistically significant and, indeed, those for women are positive. By 1991, the disadvantage for bilingual men has disappeared and unilingual men of French mother tongue now have a statistically significant advantage of 5.7 percentage points; in Table 2, the coefficient on Unil fr in 1991 is not significant. There is still a significant disadvantage for unilingual women of French mother tongue of 4.9 percentage points (Table 13b) but this effect is one-third of its 1971 size; in Table 3, this disadvantage is 2.3 percentage points and is significant. Thus, the results in Tables 12a to 13b indicate disadvantages to having French as the mother tongue which are somewhat larger than those in Tables 2 and 3. However, as also indicated in Tables 2 and 3, the French mother tongue disadvantage diminished markedly over the period 1971 to 1991; indeed, in the case of unilingual males of French mother tongue, Table 12b indicates an earnings advantage over unilingual Anglophones.

In the econometric formulation that underlies Tables 12a to 13b the value of bilingualism is not as obvious as in Tables 2, 3 and 4. To obtain estimates of the returns to bilingualism, it is necessary to make judicious use of information in the equations reported in Tables 12a to 13b. Table 4 indicated that the returns to bilingualism are concentrated in New Brunswick, Quebec and Ontario. Since the equations in Tables 12a to 13b do not separate New Brunswick from the other Atlantic provinces, attention is focused on Quebec and Ontario. In particular, we evaluate the returns to bilingualism and mother tongue by calculating predicted values from the equations in Tables 12a to 13b for individuals with average values of the continuous variables[17] who are working full-time for 52 weeks *per annum* in Manufacturing and the Managerial occupational class; the omitted classes are used for the remaining categorical variables. Table 15, Part (c), reports the results of the relevant calculations. For comparative purposes, Table 15, Part (a), repeats the relevant coefficients from Tables 2 and 3, while Table

---

[17] These are Experience, Schooling and their squares, Other Income and the Inverse Mill's Ratio. By including the latter in our calculations, we are, in effect, reporting predictions conditional on being in the selected samples.

15, Part (b), repeats the relevant coefficients from Table 4.[18] In the case of males, the selection-adjusted results, reported in Table 15, Part (c), for Quebec and Ontario are remarkably similar to those reported in Table 4 above—repeated in Table 15, Part (b). In general, over the period 1971–1991, all three language categories in both Quebec and Ontario improve their annual earnings relative to the baseline group of unilingual Anglophones. In 1971, unilingual Francophones were the lowest paid linguistic group; by 1991, that position is generally claimed by unilingual Anglophones. In the selection-adjusted results of Table 15, Part (c), unilingual Francophones in both Quebec and Ontario earn 5.7 percentage points more than unilingual Anglophones. In general, bilingual Anglophones have higher earnings than bilingual Francophones, though this result may not be statistically significant. An interesting exception to this are the results for Quebec prior to adjustment for sample selection; however, when sample selection is taken into account, Anglophones who chose to acquire the second official language, do better than bilingual Francophones (by about 0.9%).

In the case of females, the pattern of rewards is less clear and the differences between results which have been adjusted for selection and those which have not are more pronounced. The results for Quebec in Table 4 (repeated in Table 15, Part (b)) show that, relative to unilingual Anglophones, all other groups do better in 1991 than they did in 1971. In the selection adjusted results of Table 15, Part (c), this is true only for unilingual Francophones. Unlike males, Quebec female unilingual Francophones are the lowest paid group regardless of the adjustment for sample selection. By 1991, the highest paid group in the Quebec results of Table 4 is bilingual Francophones, though this position is claimed by bilingual Anglophones once sample selection has been taken into account. This is an interesting reversal which is consistent with the positive, albeit quantitatively small, selection displayed in Table 13a. In Ontario, the improvement over time in the earnings (relative to those of unilingual Anglophones) of linguistic groups does depend on sample selection. Without it, only bilingual Anglophones improve their relative standing; with it, only unilingual Francophones do. Bilingual Francophone women are worse off in 1991 (relative to unilingual Anglophones) regardless of whether sample selection is taken into account. In Ontario, the relative standing of the various language groups is generally insensitive to sample correction, with unilingual Francophones earning the lowest and bilingual Anglophones earning the highest income.[19]

---

[18] Note that the results in Table 15, part (a), do not depend on particular regions because the regional dummy variables affect the base line of unilingual English as well as all the other language groups and, hence, net out to zero in pairwise comparisons.

Table 16 presents, in Table 5 format, the implications of the equations presented in Tables 12a to 13b for bilingualism and mother tongue. For simplicity, we have used Ontario as a proxy for the Rest-of-Canada category in Table 5. Results in Tables 5 and 16 are generally consistent with each other. Table 16 confirms the decline over time in the earnings of unilingual Anglophones in Quebec relative to those in Ontario. By 1991, male and female Anglophone earnings in Quebec are 10.1 and 2.5 percentage points below those of Anglophones in Ontario. The decline in the earnings of Anglophones in Quebec exaggerates the improvement in the returns to bilingualism in Quebec because this was the comparison group in most of our earlier estimates. Table 16 also confirms that all Francophone men, whether unilingual or bilingual, earned more in 1991 (relative to unilingual Anglophones in Ontario) than they did in 1971. By contrast, all Anglophone categories in Table 16 had lower earnings in 1991 than they did in 1971—relative to Anglophones in Ontario.[20] The picture, in Table 16, for females is a little more complex than that for males and there are more differences between the selection-adjusted (Table 16) and selection-unadjusted (Table 5) results. Bilingual Francophone women earn less and unilingual Francophone women earn more in 1991 than in 1971—relative to Anglophone women in Ontario; this is also the pattern in Table 5, with the exception that unilingual Francophones in Quebec earn less in 1991 relative to unilingual Anglophones in the Rest-of-Canada. In Table 16, all linguistic categories of Anglophone women earn less in 1991 than in 1971—relative to unilingual Anglophone women in Ontario; this is also true in Table 5, except that bilingual Anglophones in the Rest-of-Canada improve their relative position in 1991. The broad-brush picture in

---

[19] However, in 1971, Ontario's bilingual francophones are the highest earners when sample selection is not taken into account.

[20] This is perfectly consistent with the findings in Table 5 except for the fact that, in Table 5, bilingual Anglophones in the Rest-of-Canada earn more in 1991 than in 1971—relative to unilingual Anglophones in the Rest-of-Canada.

Table 16, as in Table 5, is one of improvement in the standing of Francophones relative to unilingual Anglophones in the Rest-of-Canada. The general consistency of the results in Table 16 with those reported earlier suggests that sample selection issues, once taken into account, do not substantially modify our findings.

The equations in Tables 12a to 13b take into account the endogeneity of language, the variable of particular interest to this study. It should be noted, however, that no attempt has been made to deal with the potential endogeneity of other variables, e.g. region of residence[21], marital status, years of schooling, occupation and intensity and type of work. These issues lie beyond the scope of the current study.

6. SUMMARY OF FINDINGS AND CONCLUDING COMMENTS

In this study we estimate the effects of bilingual language skills on annual earnings, using individual data from the microdata files of the 1971, 1981 and 1991 Censuses. Estimates were derived using OLS log earnings regressions for each census year for paid workers differentiated by gender, region, age, education, occupation and industry. As well, selectivity-corrected estimates were obtained for male and female paid workers for each census year.

OLS regression estimates, summarised in Table 15, show a substantial change in the impact of official language skills on annual earnings between 1971 and 1991. Fluency in the French language did not significantly enhance the earnings of English-speakers in 1971. By 1991, bilingualism among English-speakers was associated with a 2.4 percent (males) to 3.6 percent (females) increase in annual earnings. The earnings of bilingual French-speaking males did not differ significantly from the earnings of the unilingual English-speaking comparator group in 1971. However, the earnings of unilingual French-speaking males were significantly lower, implying that the return to bilingualism was 4.6 percent (i.e. –1.3–(–5.9)).[22] By 1991, the earnings of unilingual Francophone men were not significantly different than the earnings of unilingual Anglophone men, but the earnings of bilingual French-speakers were higher by 3.2 percent. This suggests that, while fluency in the English language continued to improve the earnings of French-speaking men, the return to bilingualism had declined from 4.6 to 4.3 percent (3.2–(–1.1)) in the period 1971–1991. Unilingual French-speaking women had lower earnings than unilingual English-speaking women in both 1971 and 1991, but the earnings differential fell from 6.1 to 2.3 percent over that 20-year period. The earnings of bilingual Francophone women were 4.1 percent higher in 1971 and 2.9 percent higher in 1991 than the earnings of unilingual Anglophone women. These results suggest that knowledge of the second official language improved the earnings of French-speaking women by 10.2 percent (4.1–(–6.1)) in 1971 but by a more moderate 5.2 percent (2.9–(–2.3)) in 1991.

---

[21] See Grenier (1987).

[22] Figures involving the returns to bilingualism are calculated using the coefficients in Table 15 whether or not they are significantly different from zero. The expressions in brackets give the details of these calculations.

However, the returns to bilingualism differ by region (see Table 4). Outside Quebec, language skills had no discernible effect on male earnings in 1971, but by 1991 bilingualism was associated with a 2.2 percent increase in the earnings of English-speakers and a 3.0 percent (2.4–(–0.6)) increase in the earnings of French-speakers. Bilingual French-speaking women earned 19.7 percent (7.1–(–12.6)) more than unilingual French-speaking women in 1971. By 1991, bilingualism increased the earnings of English-speaking women by 4.4 percent and the earnings of French-speaking women by 7.3 percent (2.5–(–4.8)). However, these language effects appear to be confined to New Brunswick and Ontario. In Quebec, bilingualism increased the annual earnings of French-speaking men by 6.3 percent (–3.9–(–10.2)) in 1971, but by 1991 both Anglophone and Francophone men earned substantial premiums (9.3 and 7.2 percent, respectively) if they were bilingual. These gains were not confined to the Montreal CMA. French-speaking women gained 7.7 percent (.8–(–6.9)) in annual earnings in 1971 if they possessed French-English language skills. By 1991 this premium had fallen marginally to 7 percent (3.6–(–3.4)).

The results summarized in Table 15 give the impression that by 1991 employers in Quebec were prepared to pay substantial premiums to English and French-speaking male workers who had bilingual language skills. However, this interpretation of the results is inconsistent with the findings reported in Table 5. Aggregated earnings regressions in which region and language are interacted show that, relative to unilingual English-speaking male workers in the Rest-of-Canada, the earnings of unilingual English-speaking males in Quebec declined by 12.3 percent (–1.3–(–13.6)) between 1971 and 1991. The relative earnings of bilingual English-speaking males in Quebec also fell, but by a more modest 9.7 percent (3.9–(–5.8)). By contrast, the relative earnings of unilingual and bilingual French-speaking males in Quebec increased by only 0.8 (–8.6–(–9.4)) and 1.5 (–3.9–(–5.4)) percent, respectively, between 1971 and 1991, although the 1991 annual earnings of both Francophone linguistic groups were still significantly lower than the annual earnings of the non-Quebec unilingual English-speaking comparison group (8.6 and 3.9 percent, respectively). Thus, while the earnings of bilingual Anglophones and Francophones in Quebec, relative to the earnings of unilingual Anglophones in Quebec, have risen sharply between 1971 and 1991, the relative increase is not solely the result of higher absolute earnings paid to bilingual male workers. A major share of the relative increase in the earnings of bilingual workers must be attributed to the severe decline in the labour market status of unilingual English-speaking males in Quebec.[23]

The OLS regression results are predicated on the assumption that fluency in the second official language is exogenous. However, very few bilingual individuals achieve this double fluency because of propitious mother tongue circumstances. Most individuals acquire fluency in the second language later in life, most likely as a calculated human capital investment; that is, bilingualism may be endogenous. If this is the case, the results summarised above may be inaccurate. However, econometric procedures which allow for this possible endogeneity produce only minor changes in the estimated wage equations. The OLS results summarised above are, in general, reliable estimates of the effects of bilingualism on labour market earnings.

An analysis of more detailed regression results failed to uncover any definitive age, educational, or occupational patterns to the returns to bilingualism outside Quebec. However, fluency in both official languages is generally associated with significantly higher earnings in the public sector in 1991 for both male and female English and

---

[23] See also the comments by Boulet (1980) on this point.

French-speakers. In Quebec, an investment in a second official language is associated with significantly higher earnings for males aged 15–29 and 30–49 years, for males with high school education, females with university education, and for males in the goods producing sector. In general, however, there is no evidence of any strong, distinct pattern in the returns to bilingualism when the analysis is conducted by age, education, occupation or industry groupings for Quebec or the Rest-of-Canada.

Our results suggest that the relationship between language and earnings is rather complex. It is complicated by the regional dominance of the two official languages (French in Quebec and English outside Quebec) and by language policies in English and French Canada. In Quebec language policy promotes the use of the French language in schools and in the workplace, and encourages the employment of Francophones in high wage jobs. Such language policies have altered historic economic structures and relationships. To retain their economic status, Anglophones who remain in Quebec will need to make an investment in French-language skills.

Despite the diminished status of the English language in Quebec, there are strong economic incentives for Francophones to invest in English-language fluency. Labour market forces dictate a significant earnings premium for Francophone males who acquire fluency in the English language, and a growing proportion of French-speaking male paid workers appear to have made this investment between 1971 and 1991. Since French is the language of work in Quebec, trade with North American firms outside Quebec requires an investment in English by Francophones in Quebec or an investment in French by Anglophones outside Quebec. As Breton and Mieszkowski (1977) have argued in the context of a small country-large country trade model, the returns to an investment in English by French-speakers in Quebec should be substantially higher than the returns to an investment in French by the English-speaking majority in Canada (or North America). Not surprisingly, the effect of bilingual language skills on earnings is higher for Francophones in Quebec than for Anglophones in the Rest-of-Canada, and a substantially higher proportion of Francophones in Quebec than Anglophones outside Quebec are bilingual.

Nonetheless, by 1991 there are significant returns to bilingual language skills in the Rest-of-Canada as well. While the finding that English language fluency improves the earnings of French-speakers is not unexpected, the finding that French language fluency improves the earnings of English-speakers is encouraging, despite some evidence that this result has regional limitations and that it may be most pronounced in the public sector. The finding that there are positive economic returns to an investment in the French language in the Rest-of-Canada augurs well for the future of bilingualism. It also suggests that federal language policy may finally be having its intended effect.

TABLES

Table 1a Sample Size by Region, Census Year, Gender and Language Group

Region and Language	Sample Size (Number and Percentage)					
	Males			Females		
	1971	1981	1991	1971	1981	1991
Canada	36,105	89,037	155,103	19,667	61,127	128,772
Unil eng	60.79	62.16	63.84	65.48	64.07	64.04
Bil eng	4.59	5.31	4.96	4.41	5.56	5.63
Unil fr	16.82	16.37	14.98	16.07	17.13	16.02
Bil fr	17.80	16.16	16.23	14.05	13.24	14.30
Quebec	11,694	26,909	44,578	5,675	17,282	35,614
Unil eng	5.28	2.81	2.02	7.75	3.27	2.14
Bil eng	6.43	6.10	5.59	6.15	6.28	5.60
Unil fr	49.96	52.81	50.87	53.83	58.95	56.43
Bil fr	38.33	38.28	41.51	32.26	31.50	35.83
Rest-of-Canada	24,411	62,128	110,525	13,992	43,845	93,158
Unil eng	87.39	87.86	88.76	88.89	88.04	87.71
Bil eng	3.71	4.97	4.70	3.71	5.27	5.64
Unil fr	0.94	0.58	0.50	0.75	0.64	0.58
Bil fr	7.96	6.58	6.04	6.65	6.05	6.07

Table 1b Average Annual Earnings by Region, Census Year, Gender and Language Group

Region and Language	Average Annual Earnings					
	Males			Females		
	1971	1981	1991	1971	1981	1991
Canada	7,220	18,044	32,841	3,407	9,305	19,804
Unil eng	7,514	18,286	33,196	3,382	9,142	19,584
Bil eng	9,312	21,494	40,234	4,099	10,799	24,789
Unil fr	5,361	14,643	26,350	3,069	8,650	16,827
Bil fr	7,434	19,426	35,175	3,692	10,314	22,168
Quebec	6,758	17,324	31,208	3,476	9,710	19,470
Unil eng	8,762	18,297	30,169	3,910	10,618	20,178
Bil eng	9,514	20,953	36,534	3,892	10,943	22,901
Unil fr	5403	14,734	26,493	3,100	8,751	16,958
Bil fr	7,786	20,249	36,319	3,920	11,164	22,849
Rest-of-Canada	7,441	18,356	33,499	3,379	9,145	19,932
Unil eng	7,477	18,285	33,224	3,363	9,120	19,578
Bil eng	9,145	21,782	42,010	4,238	10,732	25,505
Unil fr	4,270	11,102	20,505	2,167	5,003	11,913
Bil fr	6,622	17,354	32,002	3,244	8,571	20,631

BEST COPY AVAILABLE

Table 2 OLS Log Earnings Regression Results for All Males, 1971, 1981 and 1991[a] ([t]-statistics)

	Census Year					
	1971		1981		1991	
	coeff.	[t]	coeff.	[t]	coeff.	[t]
Constant	5.573*	(127.41)	6.455*	(198.38)	6.898*	(203.48)
Region[b]						
Atlantic	-0.209*	(18.00)	-0.096*	(11.72)	-0.132*	(18.62)
Quebec	-0.034*	(2.70)	0.019*	(1.99)	-0.074*	(8.63)
Prairie	-0.140*	(10.60)	0.013	(1.43)	-0.142*	(18.30)
West	-0.009	(0.92)	0.147*	(23.04)	-0.025*	(4.60)
Experience	0.037*	(36.30)	0.033*	(48.41)	0.031*	(48.81)
Experience^2	-0.001*	(33.14)	-0.001*	(39.54)	-0.001*	(35.65)
Household[b]						
Head	0.035*	(2.11)	0.093*	(5.67)	0.065*	(9.13)
Child	-0.088*	(5.28)	-0.127*	(13.33)	-0.166*	(20.52)
Relative	-0.019	(0.67)	-0.079*	(5.45)	-0.083*	(6.39)
Urban	0.093*	(13.19)	0.049*	(10.21)	0.086*	(20.68)
Marital Status[b]						
Married	0.241*	(18.42)	0.118*	(6.74)	0.159*	(22.72)
Other	0.149*	(8.46)	0.075*	(6.11)	0.086*	(10.97)
Yrs School	-0.003	(0.60)	-0.007	(1.94)	0.028*	(9.09)
Yrs School^2	0.003*	(12.68)	0.002*	(13.38)	0.001*	(7.76)
Training	0.047*	(5.38)	0.019*	(2.97)	0.031*	(5.82)
Other Income	0.002	(1.08)	-0.001	(1.20)	-0.002*	(5.73)
Weeks Worked[b]						
Wks 14-26	0.744*	(36.13)	0.921*	(72.54)	0.763*	(66.42)
Wks 27-39	1.147*	(58.67)	1.297*	(98.99)	1.102*	(91.97)
Wks 40-48	1.445*	(75.69)	1.610*	(131.27)	1.377*	(121.58)
Wks 49-52	1.537*	(86.01)	1.712*	(150.10)	1.500*	(143.57)
Full-time	0.407*	(29.21)	0.476*	(51.09)	0.626*	(73.73)
Self-employed	-0.052*	(4.58)	-0.098*	(12.67)	-0.130*	(20.49)
Language[b]						
Bil eng	0.025	(1.51)	0.030*	(2.90)	0.024*	(2.60)
Unil fr	-0.059*	(4.00)	-0.010	(0.91)	-0.011	(1.08)
Bil fr	-0.013	(1.05)	0.018*	(2.03)	0.032*	(3.94)
R^2	.510		.509		.427	
N	36,105		89,037		155,103	

[a] Equations include (not shown) 9 industry and 14 occupation variables.

[b] Omitted variables are: Region (Ontario), Household (Not Related), Marital Status (Single), Weeks Worked (Wks 0-13), Language (Unilingual English).

* Significant at the 5 percent level.

Table 3 OLS Log Earnings Regression Results for All Females, 1971, 1981and 1991a ([t] -statistics)

	Census Year					
	1971		1981		1991	
	coeff.	[t]	coeff.	[t]	coeff.	[t]
Constant	5.219*	(52.66)	6.088*	(109.84)	6.511*	(149.69)
Region[b]						
Atlantic	-0.223*	(12.29)	-0.023*	(2.10)	-0.115*	(13.97)
Quebec	-0.0029	(0.10)	0.089*	(6.87)	-0.044*	(4.46)
Prairie	-0.155*	(8.18)	0.018	(1.51)	-0.128*	(14.74)
West	-0.053*	(3.75)	0.139*	(17.08)	-0.023*	(3.88)
Experience	0.017*	(12.52)	0.018*	(21.26)	0.023*	(31.20)
Experience^2	-0.3E-3*	(9.38)	-0.3E-3*	(15.91)	-0.4E-3*	(23.60)
Household[b]						
Head	0.124*	(5.84)	-0.081*	(5.22)	0.049*	(6.30)
Child	0.4E-3	(0.02)	-0.099*	(7.72)	-0.144*	(13.51)
Relative	0.091*	(2.77)	-0.024	(1.26)	-0.039*	(2.46)
Urban	0.101*	(9.61)	0.052*	(8.47)	0.112*	(23.62)
Marital Status[b]						
Married	0.028	(1.50)	0.051*	(3.04)	0.008	(1.06)
Other	-0.055*	(2.81)	0.029*	(1.96)	0.029*	(3.48)
Yrs School	-0.022*	(2.64)	-0.025*	(4.01)	0.022*	(5.07)
Yrs School^2	0.003*	(8.24)	0.003*	(11.68)	0.001*	(8.74)
Training	0.051*	(3.78)	-0.018	(1.73)	-0.012	(1.65)
Other Income	0.008	(1.89)	0.010*	(8.11)	-0.002*	(3.55)
Weeks Worked[b]						
Wks 14-26	0.979*	(51.16)	1.027*	(87.30)	0.899*	(83.99)
Wks 27-39	1.416*	(72.31)	1.437*	(111.82)	1.285*	(112.31)
Wks 40-48	1.754*	(92.55)	1.767*	(149.20)	1.548*	(144.90)
Wks 49-52	1.890*	(115.34)	1.970*	(193.72)	1.733*	(184.12)
Full-time	0.647*	(52.26)	0.593*	(84.96)	0.621*	(115.99)
Self-employed	-0.084*	(2.97)	-0.092*	(5.92)	-0.115*	(11.91)
Language[b]						
Bil eng	0.3E-3	(0.01)	0.028*	(2.11)	0.036*	(3.64)
Unil fr	-0.061*	(2.71)	0.004	(0.29)	-0.023*	(2.08)
Bil fr	0.041*	(2.23)	0.034*	(2.84)	0.029*	(3.13)
R^2	.621		.589		.492	
N	19,667		61,127		128,772	

[a] Equations include (not shown) 9 industry and 14 occupation variables.

[b] Omitted variables are: Region (Ontario), Household (Not Related), Marital Status (Single), Weeks Worked (Wks 0-13), Language (Unilingual English).

* Significant at the 5 percent level.

BEST COPY AVAILABLE

Table 4 Partial Results from Log Earnings Equations by Gender and Region, 1971, 1981 and 1991 (t -statistics)

	Male			Female		
	1971	1981	1991	1971	1981	1991
Quebec						
Bil eng	0.058	0.040	0.093*	-0.1E-3	0.043	0.016
	(1.88)	(1.52)	(3.34)	(0.00)	(1.23)	(0.51)
Unil fr	-0.102*	-0.016	0.033	-0.069	0.013	-0.034
	(4.06)	(0.70)	(1.35)	(1.94)	(0.42)	(1.25)
Bil fr	-0.039	0.018	0.105*	0.008	0.057	0.036
	(1.57)	(0.80)	(4.27)	(0.22)	(1.91)	(1.28)
Montreal						
Bil eng	0.041	0.006	0.077*	-0.034	0.017	0.026
	(1.15)	(0.20)	(2.33)	(0.67)	(0.42)	(0.71)
Unil fr	-0.068*	-0.056*	0.023	-0.129*	-0.003	-0.053
	(2.25)	(2.00)	(0.77)	(3.26)	(0.09)	(1.58)
Bil fr	-0.007	-0.028	0.085*	-0.004	0.075*	0.044
	(0.24)	(1.05)	(2.86)	(0.09)	(2.18)	(1.33)
Rest-of-Quebec						
Bil eng	—	0.103*	0.084	—	0.179*	-0.027
		(2.18)	(1.70)		(2.42)	(0.47)
Unil fr	—	0.079*	0.061	—	0.046	-0.013
		(2.01)	(1.50)		(0.75)	(0.27)
Bil fr	—	0.122*	0.133*	—	0.058	0.030
		(3.05)	(3.22)		(0.92)	(0.61)
Rest-of-Canada						
Bil eng	-0.020	0.030*	0.022*	-0.013	0.045*	0.044*
	(0.95)	(2.37)	(2.02)	(0.41)	(2.77)	(3.87)
Unil fr	0.015	0.039	-0.006	-0.126	0.062	-0.048
	(0.35)	(1.08)	(0.19)	(1.89)	(1.38)	(1.38)
Bil fr	0.011	0.020	0.024*	0.071*	0.022	0.025*
	(0.76)	(1.79)	(2.49)	(3.09)	(1.45)	(2.29)
New Brunswick						
Bil eng	0.015	0.062	0.041	-0.209	0.010	0.015
	(0.18)	(1.20)	(0.87)	(1.45)	(0.14)	(0.27)
Unil fr	0.102	0.076	-0.086*	-0.083	-0.026	-0.016
	(1.54)	(1.58)	(2.03)	(0.79)	(0.40)	(0.33)
Bil fr	0.018	0.011	0.1E-3	0.118	0.061	0.064*
	(0.43)	(0.41)	(0.01)	(1.71)	(1.51)	(2.01)

Ontario						
Bil eng	0.005	0.027	0.030*	0.032	0.055*	0.058*
	(0.20)	(1.60)	(2.13)	(0.86)	(2.60)	(3.93)
Unil fr	0.014	0.069	0.092	-0.056	0.043	-0.078
	(0.22)	(1.11)	(1.42)	(0.56)	(0.53)	(1.13)
Bil fr	0.026	0.037*	0.019	0.096*	0.037	0.028
	(1.32)	(2.41)	(1.44)	(3.31)	(1.79)	(1.93)
Rest-of-Ontario						
Bil eng	—	0.027	0.034*	—	0.047*	0.060*
		(1.46)	(2.09)		(2.00)	(3.63)
Unil fr	—	0.088	0.123	—	0.081	-0.042
		(1.26)	(1.73)		(0.91)	(0.51)
Bil fr	—	0.051*	0.023	—	0.027	0.016*
		(2.94)	(1.50)		(1.13)	(0.97)
All Other Provinces						
Bil eng	-0.093*	0.025	-0.008	-0.066	0.040	0.027
	(2.31)	(1.18)	(0.43)	(1.18)	(1.50)	(1.42)
Unil fr	-0.025	0.145	0.097	-0.546	0.149	0.049
	(0.16)	(0.86)	(0.50)	(2.33)	(0.74)	(0.19)
Bil fr	-0.025	0.010	0.032	-0.016	-0.038	0.012
	(0.87)	(0.46)	(1.79)	(0.35)	(1.35)	(0.56)

* Significant at the 5 percent level.

a Excluding New Brunswick, Quebec, Ontario

Table 5 Interactive Language Coefficients and t -Statistics from Estimated Log Earnings Equations by Gender: 1971, 1981 and 1991

Interactive Language Variables	Males			Females		
	1971	1981	1991	1971	1981	1991
Unil eng* Que	-0.013	0.020	-0.136*	0.026	0.066*	-0.036
	(0.52)	(0.81)	(5.48)	(0.78)	(2.15)	(1.26)
Bil eng* ROC	-0.015	0.027*	0.027*	-0.016	0.031*	0.046*
	(0.74)	(2.19)	(2.53)	(0.52)	(1.99)	(4.14)
Bil eng* Que	0.039	0.056*	-0.058*	0.024	0.111*	-0.033
	(1.70)	(3.35)	(3.79)	(0.65)	(4.97)	(1.87)
Unil fr* ROC	-0.003	0.032	-0.019	-0.118	0.052	-0.055
	(0.07)	(0.92)	(0.56)	(1.77)	(1.20)	(1.64)
Unil fr* Que	-0.094*	0.008	-0.086*	-0.059*	0.091*	-0.066*
	(9.14)	(1.13)	(13.80)	(3.83)	(10.10)	(9.61)
Bil fr* ROC	0.007	0.017	0.020*	0.070*	0.022	0.024*
	(0.49)	(1.63)	(2.17)	(3.06)	(1.51)	(2.20)
Bil fr* Que	-0.054*	0.038*	-0.039*	0.026	0.128*	-0.013
	(5.01)	(4.87)	(6.04)	(1.42)	(11.57)	(1.60)

Table 6a Quebec Language Coeffecients and t -Statistics from Estimated Log Earnings Equations by Gender, Region and Age Group: 1971, 1981, and 1991

Age	Males			Females		
	1971	1981	1991	1971	1981	1991
15-29 years						
Bil eng	0.141*	0.107*	0.138*	-0.043	0.073	-0.066
	(2.40)	(2.08)	(2.35)	(0.62)	(1.32)	(0.98)
Unil fr	0.009	0.054	0.109*	-0.022	0.019	-0.108
	(0.20)	(1.24)	(2.10)	(0.44)	(0.40)	(1.77)
Bil fr	0.032	0.088*	0.173*	0.068	0.042	-0.021
	(0.70)	(2.00)	(3.32)	(1.30)	(0.86)	(0.34)
30-49 years						
Bil eng	0.040	0.002	0.113*	0.044	0.066	0.069
	(0.88)	(0.05)	(2.94)	(0.50)	(1.12)	(1.65)
Unil fr	-0.177*	-0.034	0.070*	-0.091	0.051	-0.002
	(4.86)	(1.00)	(2.02)	(1.35)	(1.02)	(0.05)
Bil fr	-0.077*	-0.011	0.138*	-0.014	0.106*	0.069
	(2.17)	(0.33)	(4.02)	(0.20)	(2.14)	(1.86)
50-64 years						
Bil eng	-0.003	0.019	0.039	0.023	-0.023	-0.022
	(0.05)	(0.38)	(0.68)	(0.22)	(0.31)	(0.30)
Unil fr	-0.119*	-0.083*	-0.127*	-0.189*	-0.108	-0.057
	(2.28)	(2.00)	(2.67)	(2.42)	(1.70)	(1.00)
Bil fr	-0.083	-0.039	-0.026	-0.142	-0.016	-0.010
	(1.63)	(0.93)	(0.54)	(1.84)	(0.26)	(0.17)

* Significant at the 5 percent level.

Table 6b Rest-of-Canada Language Coeffecients and t -Statistics from Estimated Log Earnings Equations by Gender, Region and Age Group: 1971, 1981, and 1991

Age	Males			Females		
	1971	1981	1991	1971	1981	1991
15-29 years						
Bil eng	-0.039	-0.002	0.007	-0.005	0.061*	0.048*
	(1.14)	(0.07)	(0.30)	(0.13)	(2.81)	(2.51)
Unil fr	0.141*	0.096	-0.011	-0.060	0.023-	0.187*
	(2.05)	(1.61)	(0.18)	(0.58)	(0.35)	(2.83)
Bil fr	-0.002	0.025	0.053*	0.038	0.007	0.026
	(0.07)	(1.28)	(2.51)	(1.11)	(0.29)	(1.15)
30-49 years						
Bil eng	0.001	0.048*	0.022	0.021	-0.001	0.049*
	(0.03)	(2.69)	(1.59)	(0.37)	(0.03)	(3.27)
Unil fr	-0.070	0.055	-0.051	0.020	0.070	0.008
	(1.12)	(0.98)	(1.18)	(0.18)	(0.97)	(0.18)
Bil fr	0.023	0.005	0.020	0.115*	0.028	0.020
	(1.16)	(0.32)	(1.70)	(3.06)	(1.23)	(1.45)
50-64 years						
Bil eng	-0.016	0.028	0.071*	-0.128	0.027	0.051
	(0.29)	(0.88)	(2.34)	(1.49)	(0.52)	(1.21)
Unil fr	-0.062	-0.144	0.079	-0.503*	0.016	0.014
	(0.66)	(1.86)	(1.04)	(3.41)	(0.14)	(0.15)
Bil fr	0.006	0.008	-0.016	0.021	0.008	0.031
	(0.18)	(0.34)	(0.70)	(0.37)	(0.21)	(1.09)

* Significant at the 5 percent level.

Table 7a Quebec Language Coeffecients and t-Statistics from Estimated Log Earnings Equations by Gender, Region and Education Group: 1971, 1981, and 1991

Education	Males			Females		
	1971	1981	1991	1971	1981	1991
Elementary						
Bil eng	0.176*	0.215*	0.251*	-0.088	0.130	-0.009
	(2.92)	(3.08)	(2.20)	(0.71)	(1.01)	(0.04)
Unil fr	0.027	0.149*	0.136	-0.256*	0.167	-0.071
	(0.61)	(2.79)	(1.64)	(2.95)	(1.63)	(0.58)
Bil fr	0.074	0.118*	0.167	-0.130	0.233*	-0.066
	(1.62)	(2.12)	(1.94)	(1.42)	(2.17)	(0.51)
High School						
Bil eng	0.036	-0.023	0.101*	0.026	0.020	-0.053
	(0.85)	(0.69)	(2.87)	(0.46)	(0.49)	(1.33)
Unil fr	-0.132*	-0.048	0.089*	-0.025	-0.028	-0.062
	(3.87)	(1.70)	(2.93)	(0.60)	(0.82)	(1.82)
Bil fr	-0.067*	-0.009	0.151*	0.027	0.009	0.013
	(2.03)	(0.32)	(4.94)	(0.64)	(0.27)	(0.38)
University						
Bil eng	-0.059	0.022	-0.049	-0.024	0.072	0.136*
	(0.78)	(0.45)	(1.04)	(0.19)	(0.98)	(2.74)
Unil fr	-0.280*	-0.095*	-0.157*	0.2E-3	0.109	0.069
	(3.50)	(2.05)	(3.48)	(0.00)	(1.59)	(1.48)
Bil fr	-0.157*	-0.025	-0.052	0.055	0.150*	0.112*
	(2.45)	(0.56)	(1.19)	(0.54)	(2.24)	(2.43)

* Significant at the 5 percent level.

Table 7b Rest-of-Canada Language Coeffecients and t -Statistics from Estimated Log Earnings Equations by Gender, Region and Age Group: 1971, 1981, and 1991

Education	Males			Females		
	1971	1981	1991	1971	1981	1991
Elementary						
Bil eng	-0.039	-0.007	0.037	0.056	0.113	0.165
	(0.70)	(0.13)	(0.41)	(0.43)	(1.21)	(0.99)
Unil fr	0.089	0.072	0.054	-0.085	0.194*	0.030
	(1.63)	(1.23)	(0.80)	(0.86)	(2.24)	(0.30)
Bil fr	0.067*	0.070*	0.089*	0.039	0.047	0.039
	(2.64)	(2.52)	(2.50)	(0.75)	(0.97)	(0.62)
High School						
Bil eng	-0.003	0.011	-0.023	-0.020	0.014	0.011
	(0.08)	(0.59)	(1.38)	(0.53)	(0.67)	(0.65)
Unil fr	-0.060	0.011	-0.048	-0.148	-0.063	-0.079
	(0.73)	(0.21)	(1.09)	(1.34)	(1.07)	(1.81)
Bil fr	-0.014	0.017	0.026*	0.069*	0.009	0.014
	(0.66)	(1.22)	(2.24)	(2.48)	(0.49)	(1.07)
University						
Bil eng	-0.038	0.035*	0.032*	-0.1E-3	0.018	0.040*
	(1.13)	(1.98)	(2.51)	(0.00)	(0.75)	(2.78)
Unil fr	0.117	0.272	-0.031	-0.054	0.072	-0.093
	(0.35)	(1.53)	(0.34)	(0.18)	(0.39)	(1.08)
Bil fr	-0.122*	-0.044	-0.021	0.162*	0.022	0.033
	(2.59)	(1.61)	(1.09)	(2.07)	(0.63)	(1.59)

* Significant at the 5 percent level.

Table 8a Quebec Language Coefficients and t -Statistics from Estimated Log Earnings Equations by Gender, Region and Occupational Group: 1971, 1981, and 1991

Occupational Group	Males 1971	Males 1981	Males 1991	Females 1971	Females 1981	Females 1991
Managerial/ Professional						
Bil eng	0.061	-0.013	0.066	0.046	0.019	-0.027
	(0.89)	(0.29)	(1.66)	(0.43)	(0.30)	(0.80)
Unil fr	-0.193*	-0.101*	-0.033	0.154	0.100	-0.086*
	(2.98)	(2.42)	(0.90)	(1.93)	(1.82)	(2.82)
Bil fr	-0.091	-0.015	0.073*	0.112	0.129*	-0.012
	(1.67)	(0.34)	(2.04)	(1.39)	(2.34)	(0.41)
White Collar						
Bil eng	0.071	0.060	0.116	0.072	0.003	0.053
	(1.34)	(1.30)	(1.84)	(1.25)	(0.08)	(0.64)
Unil fr	-0.103*	-0.026	0.013	-0.122*	-0.081*	0.019
	(2.24)	(0.64)	(0.23)	(2.73)	(2.20)	(0.26)
Bil fr	-0.009	0.037	0.096	0.004	-0.005	0.115
	(0.27)	(0.92)	(1.68)	(0.09)	(0.12)	(1.62)
Blue Collar						
Bil eng	0.040	0.038	0.080	-0.406*	0.244*	0.188
	(0.83)	(0.90)	(1.71)	(2.90)	(2.01)	(1.70)
Unil fr	-0.069	0.014	0.095*	-0.198*	0.127	0.059
	(1.94)	(0.41)	(2.44)	(2.27)	(1.31)	(0.69)
Bil fr	-0.024	0.014	0.148*	-0.758	0.150	0.105
	(0.67)	(0.39)	(3.77)	(0.80)	(1.49)	(1.18)

* Significant at the 5 percent level.

Table 8b Rest-of-Canada Language Coefficients and t -Statistics from Estimated Log Earnings Equations by Gender, Region and Occupational Group: 1971, 1981, and 1991

Occupational	Males			Females		
Group	1971	1981	1991	1971	1981	1991
Managerial/ Professional						
Bil eng	-0.059	0.029	0.034*	0.001	0.4E-3	0.049*
	(1.62)	(1.61)	(2.69)	(0.01)	(0.01)	(4.12)
Unil fr	0.009	-0.235	-0.079	-0.110	0.102	-0.111*
	(0.02)	(1.28)	(1.01)	(0.59)	(0.64)	(2.31)
Bil fr	-0.075	0.4E-3	-0.056	0.157*	0.093*	0.022
	(1.76)	(0.02)	(1.02)	(3.21)	(3.08)	(1.76)
White Collar						
Bil eng	-0.002	0.011	0.009	-0.050	0.025	0.057
	(0.06)	(0.47)	(0.35)	(1.23)	(1.25)	(1.83)
Unil fr	0.033	-0.024	-0.079	-0.054	-0.136*	0.055
	(0.24)	(0.24)	(0.88)	(1.74)	(2.19)	(0.81)
Bil fr	-0.040	-0.036	0.028	0.024	-0.001	0.032
	(1.49)	(1.59)	(1.17)	(0.85)	(0.04)	(1.28)
Blue Collar						
Bil eng	-0.024	0.031	-0.018	0.012	0.107	-0.035
	(0.68)	(1.40)	(0.81)	(0.11)	(1.71)	(0.62)
Unil fr	0.039	0.079	0.040	-0.150	0.196*	-0.098
	(0.83)	(1.89)	(1.00)	(1.12)	(2.42)	(1.15)
Bil fr	0.043*	0.052*	0.050*	0.103	0.029	-0.011
	(2.19)	(3.47)	(3.61)	(1.65)	(0.64)	(0.26)

* Significant at the 5 percent level.

Table 9a Quebec Language Coefficients and t -Statistics from Estimated Log Earnings Equations by Gender, Region and Industrial Group: 1971, 1981, and 1991

Industrial	Males			Females		
Group	1971	1981	1991	1971	1981	1991
Goods						
Bil eng	0.037	0.035	0.105*	-0.076	0.085	0.110
	(0.93)	(0.97)	(2.75)	(0.94)	(1.25)	(1.86)
Unil fr	-0.102*	-0.009	0.105*	-0.196*	-0.046	0.017
	(3.32)	(0.28)	(3.21)	(3.40)	(0.79)	(0.34)
Bil fr	-0.049	0.014	0.152*	-0.036	0.041	0.089
	(1.61)	(0.45)	(4.61)	(0.61)	(0.71)	(1.74)
Finance/Service/ Trade						
Bil eng	0.109	-0.003	0.043	0.029	0.021	-0.055
	(1.85)	(0.07)	(0.96)	(0.47)	(0.51)	(1.39)
Unil fr	-0.086	-0.049	-0.038	-0.002	0.038	-0.060
	(1.72)	(1.31)	(0.92)	(0.03)	(1.07)	(1.73)
Bil fr	0.002	-0.008	0.038	0.030	0.061	-0.009
	(0.03)	(0.22)	(0.94)	(0.62)	(1.69)	(0.26)
Public Sector						
Bil eng	0.003	0.118	0.148	0.155	-0.010	-0.006
	(0.02)	(1.19)	(1.45)	(0.67)	(0.06)	(0.04)
Unil fr	-0.125	0.064	0.062	-0.159	-0.101	-0.106
	(1.42)	(0.73)	(0.67)	(1.14)	(0.74)	(0.86)
Bil fr	-0.058	0.098	0.152	0.063	-0.006	0.015
	(0.67)	(1.15)	(1.64)	(0.47)	(0.04)	(0.11)

* Significant at the 5 percent level.

Table 9b Rest-of-Canada Language Coefficients and t -Statistics from Estimated Log Earnings Equations by Gender, Region and Industrial Group: 1971, 1981, and 1991

Industrial	Males			Females		
Group	1971	1981	1991	1971	1981	1991
Goods						
Bil eng	0.001	0.043*	0.010	0.038	0.066	0.035
	(0.02)	(2.22)	(0.54)	(0.55)	(1.77)	(1.17)
Unil fr	0.006	0.087*	0.045	-0.091	0.157*	-0.149*
	(0.13)	(2.03)	(1.11)	(0.83)	(2.26)	(2.11)
Bil fr	0.073*	0.054*	0.042*	0.005	0.016	-0.030
	(3.75)	(3.67)	(3.07)	(0.11)	(0.47)	(1.16)
Finance/Service/ Trade						
Bil eng	-0.030	0.011	0.005	-0.038	0.026	0.045*
	(0.83)	(0.54)	(0.32)	(1.05)	(1.39)	(3.33)
Unil fr	0.258	0.081	-0.095	0.144	-0.052	-0.010
	(1.86)	(1.02)	(1.50)	(1.67)	(0.85)	(0.22)
Bil fr	-0.082*	-0.029	-0.003	0.099*	0.007	0.044*
	(2.73)	(1.38)	(0.15)	(3.46)	(0.42)	(3.30)
Public Sector						
Bil eng	-0.016	0.056*	0.085*	0.123	0.061	0.076*
	(0.43)	(2.14)	(4.25)	(1.44)	(1.23)	(2.97)
Unil fr	0.167	-0.510*	-0.259*	0.358	-0.091	0.125
	(1.15)	(3.15)	(2.57)	(0.65)	(0.33)	(1.11)
Bil fr	0.021	0.017	0.038	0.107	0.109*	0.051*
	(0.69)	(0.68)	(1.90)	(1.72)	(2.52)	(2.12)

* Significant at the 5 percent level.

Table 10 Probit Bilingualism Equations for All Males: 1971, 1981 and 1991

	Census Year					
	1971		1981		1991	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Constant	-2.659*	(0.143)	-2.535*	(0.096)	-2.433*	(0.073)
Region[a]						
Atlantic	0.022	(0.053)	0.130*	(0.035)	0.604*	(0.028)
Quebec	-0.198*	(0.038)	-0.363*	(0.025)	-0.144*	(0.020)
Prairie	0.175*	(0.062)	0.013	(0.039)	-0.098*	(0.031)
West	0.008	(0.050)	-0.113*	(0.027)	-0.142*	(0.020)
Age	0.018*	(0.005)	0.032*	(0.003)	0.003	(0.003)
Age^2	-0.1E-3*	(0.6E-4)	-0.3E-3*	(0.4E-4)	0.7E-4*	(0.3E-4)
Household[a]						
Head	-0.067	(0.045)	-0.143*	(0.041)	-0.114*	(0.015)
Child	-0.186*	(0.045)	-0.306*	(0.025)	-0.163*	(0.019)
Relative	-0.155*	(0.076)	-0.194*	(0.038)	-0.194*	(0.031)
Urban	0.298*	(0.019)	0.419*	(0.012)	0.365*	(0.009)
Marital Status[a]						
Married	0.014	(0.036)	0.025	(0.044)	0.016	(0.015)
Other	0.172*	(0.048)	0.002	(0.031)	0.078*	(0.017)
Yrs School	0.076*	(0.010)	0.029*	(0.010)	0.086*	(0.006)
Yrs School^2	0.001*	(0.4E-3)	0.002*	(0.4E-4)	0.7E-4	(0.2E-3)
Religion[a]						
Protestant	-0.337*	(0.047)	-0.249*	(0.025)	-0.144*	(0.017)
Catholic	0.388*	(0.047)	0.354*	(0.025)	0.327*	(0.016)
Orthodox	0.060	(0.139)	0.151	(0.122)	0.219*	(0.079)
Eastern	-0.022	(0.072)	0.430*	(0.150)	0.178*	(0.056)
Jewish	0.611*	(0.092)	0.663*	(0.058)	0.648*	(0.042)
Birth[7]						
Maritimes[d]	-0.292*	(0.055)	-0.440*	(0.037)	-0.217*	(0.037)
New Bruns.	0.588*	(0.054)	0.554*	(0.036)	0.696*	(0.036)
Quebec	0.439*	(0.039)	0.501*	(0.025)	0.550*	(0.019)
Prairie	-0.200*	(0.054)	-0.209*	(0.034)	-0.139*	(0.027)
West	-0.419*	(0.060)	-0.385*	(0.033)	-0.290*	(0.024)

Ethnicity[a]						
British	-0.306*	(0.067)	-0.371*	(0.026)	-0.642*	(0.016)
French	0.723*	(0.067)	0.626*	(0.027)	0.324*	(0.017)
W.S. Europe	-0.312*	(0.075)	-0.443*	(0.036)		
E. Europe	-0.484*	(0.937)	-0.647*	(0.051)		
Canadian					-0.694*	(0.025)[b]
European					-0.683*	(0.023)[c]
N	36,105		89,037		155,103	
Log Likel.	-13,426		-32,716		-57,135	
x^2 (28)	11,548		27,199		45,938	
Predictions	0	1	0	1	0	1
Actual 0	25,744	2,278	64,936	4,980	113,379	8,858
1	4,055	4,028	10,206	8,915	17,941	14,925

[a] Omitted variables are: Region (Ontario), Household (Not Related), Marital Status (Single), Religion (None), Birth (Ontario), Ethnicity (Other).

[b] In the 1991 census, this line represents the response "Canadian". See the Appendix.

[c] In the 1991 census, this line represents a response indicating Europe. See the Appendix.

[d] Excludes New Brunswick.

* Significant at the 5 percent level.

Table 11 Probit Bilingualism Equations for All Females: 1971, 1981 and 1991

	Census Year					
	1971		1981		1991	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Constant	-2.177*	(0.200)	-1.766*	(0.127)	-1.818*	(0.082)
Region[a]						
Atlantic	-0.070	(0.075)	0.049	(0.041)	0.457*	(0.030)
Quebec	-0.182	(0.054)	-0.298*	(0.031)	-0.240*	(0.021)
Prairie	-0.093	(0.082)	0.068	(0.046)	-0.041	(0.033)
West	-0.177*	(0.070)	-0.020	(0.032)	-0.159*	(0.022)
Age	0.018*	(0.007)	0.004	(0.004)	-0.010*	(0.003)
Age^2	-0.2E-3*	(0.8E-4)	-0.000	(0.000)	0.2E-3*	(0.4E-4)
Household[a]						
Head	0.167*	(0.052)	-0.118*	(0.036)	-0.106*	(0.016)
Child	0.048	(0.049)	-0.090*	(0.029)	-0.023	(0.022)
Relative	0.060	(0.081)	-0.084*	(0.042)	-0.118*	(0.034)
Urban	0.266*	(0.027)	0.380*	(0.014)	0.330*	(0.010)
Marital Status[a]						
Married	0.133*	(0.045)	0.015	(0.038)	0.024	(0.015)
Other	0.137*	(0.049)	0.078*	(0.033)	0.059*	(0.017)
Yrs School	0.005	(0.019)	0.006	(0.015)	0.067*	(0.008)
Yrs School^2	0.003*	(0.001)	0.003*	(0.001)	0.001*	(0.3E-3)
Religion[a]						
Protestant	-0.475*	(0.070)	-0.252*	(0.033)	-0.206*	(0.019)
Catholic	0.295*	(0.071)	0.259*	(0.033)	0.240*	(0.018)
Orthodox	-0.059	(0.166)	0.289*	(0.125)	0.247*	(0.077)
Eastern	-0.264*	(0.104)	0.199	(0.174)	0.127	(0.067)
Jewish	0.233	(0.139)	0.560*	(0.068)	0.569*	(0.045)
Birth[a]						
Maritimes[d]	-0.299*	(0.076)	-0.361*	(0.042)	-0.183*	(0.038)
New Bruns.	0.504*	(0.075)	0.599*	(0.042)	0.685*	(0.039)
Quebec	0.136*	(0.055)	0.312*	(0.030)	0.462*	(0.020)
Prairie	0.008	(0.072)	-0.256*	(0.040)	-0.189*	(0.029)
West	-0.176*	(0.079)	-0.380*	(0.038)	-0.244*	(0.025)

Ethnicity[a]						
British	-0.271*	(0.087)	-0.413*	(0.030)	-0.640*	(0.016)
French	0.668*	(0.088)	0.521*	(0.032)	0.241*	(0.017)
W.S. Europe	-0.261*	(0.098)	-0.414*	(0.041)		
E. Europe	-0.494	(0.120)	-0.683*	(0.060)		
Canadian					-0.676*	(0.026)[b]
European					-0.683*	(0.240)[c]
N	19,667		61,127		128,772	
Log Likel.	-6,981		-22,650		-49,493	
x^2 (28)	4,847		13,786		29,650	
Predictions	0	1	0	1	0	1
Actual 0	15,381	657	47,753	1,882	98,422	4,682
1	2,573	1,056	8,412	3,080	18,424	7,244

[a] Omitted variables are: Region (Ontario), Household (Not Related), Marital Status (Single), Religion (None), Birth (Ontario), Ethnicity (Other).

[b] In the 1991 census, this line represents the response "Canadian". See the Appendix.

[c] In the 1991 census, this line represents a response indicating Europe. See the Appendix.

[d] Excludes New Brunswick.

* Significant at the 5 percent level.

Table 12a Selection-Corrected Log Earnings Equations for Bilingual Males: 1971, 1981 and 1991

	Census Year					
	1971		1981		1991	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Constant	5.665*	(0.112)	6.780	(0.084)	7.191*	(0.083)
Region[a]						
Atlantic	-0.231*	(0.030)	-0.099*	(0.020)	-0.112*	(0.018)
Quebec	-0.040*	(0.017)	0.015	(0.012)	-0.070*	(0.011)
Prairie	-0.230*	(0.039)	-0.001	(0.028)	-0.161*	(0.026)
West	-0.053	(0.034)	0.094*	(0.020)	-0.063*	(0.017)
Experience	0.037*	(0.002)	0.032*	(0.001)	0.030*	(0.001)
Experience^2	-0.001*	(0.3E-4)	-0.001*	(0.3E-4)	-0.4E-3*	(0.3E-4)
Household[a]						
Head	0.046	(0.034)	0.104*	(0.032)	0.059*	(0.013)
Child	-0.051	(0.035)	-0.093*	(0.021)	-0.152*	(0.017)
Relative	0.031	(0.058)	0.023	(0.032)	-0.056	(0.030)
Urban	0.066*	(0.016)	0.038*	(0.011)	0.087*	(0.009)
Marital Status[a]						
Married	0.269*	(0.027)	0.109*	(0.034)	0.180*	(0.013)
Other	0.159*	(0.036)	0.044	(0.024)	0.108*	(0.015)
Yrs. School	-0.020*	(0.008)	-0.035*	(0.008)	0.018*	(0.006)
Yrs. School^2	0.003*	(0.3E-3)	0.003*	(0.3E-3)	0.001*	(0.2E-3)
Training	0.017	(0.017)	0.005	(0.013)	0.011	(0.012)
Other Income	0.003	(0.004)	-0.1E-3	(0.001)	-0.001	(0.001)
Weeks Worked[a]						
Wks 14-26	0.718*	(0.043)	0.968*	(0.027)	0.744*	(0.025)
Wks 27-39	1.091*	(0.041)	1.345*	(0.028)	1.062*	(0.026)
Wks 40-48	1.414*	(0.039)	1.705*	(0.026)	1.375*	(0.024)
Wks 49-52	1.490*	(0.036)	1.790*	(0.024)	1.488*	(0.022)
Full Time	0.402*	(0.029)	0.474*	(0.020)	0.635*	(0.018)
Self-Employed	0.014	(0.023)	-0.052*	(0.016)	-0.086*	(0.013)
Mother Tongue Fr	-0.062*	(0.023)	-0.046*	(0.015)	-0.008	(0.013)
Lamda	-0.011	(0.021)	-0.047*	(0.015)	-0.012	(0.014)
Selected N	8,083		19,121		32,866	
Total N	36,105		89,037		155,103	
R^2	0.504		0.528		0.441	

[a] Omitted variables are: Region (Ontario), Household (Not Related), Marital Status (Single), Religion (None), Birth (Ontario), Ethnicity (Other). The equations include (not shown) 9 industry and 14 occupational variables.

* Significant at the 5 percent level.

Table 12b Selection-Corrected Log Earnings Equations for Unilingual Males: 1971, 1981 and 1991

	Census Year					
	1971		1981		1991	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Constant	5.587*	(0.050)	6.366*	(0.040)	6.856*	(0.039)
Region[a]						
Atlantic	-0.202*	(0.013)	-0.096*	(0.009)	-0.132*	(0.008)
Quebec	-0.034	(0.022)	0.006	(0.020)	-0.101*	(0.020)
Prairie	-0.126*	(0.014)	0.018	(0.010)	-0.143*	(0.008)
West	-0.005	(0.011)	0.156*	(0.007)	-0.027*	(0.006)
Experience	0.036*	(0.001)	0.033*	(0.001)	0.032*	(0.001)
Experience^2	-0.001*	(0.2E-4)	-0.001*	(0.2E-4)	-0.001*	(0.1E-4)
Household[a]						
Head	0.031	(0.019)	0.093*	(0.019)	0.067*	(0.008)
Child	-0.100*	(0.019)	-0.133*	(0.011)	-0.171*	(0.009)
Relative	-0.037	(0.033)	-0.101*	(0.016)	-0.091*	(0.015)
Urban	0.101*	(0.008)	0.049*	(0.006)	0.092*	(0.005)
Marital Status[a]						
Married	0.232*	(0.015)	0.118*	(0.020)	0.152*	(0.008)
Other	0.146*	(0.020)	0.082*	(0.014)	0.081*	(0.009)
Yrs. School	-0.008	(0.005)	0.009	(0.005)	0.028*	(0.004)
Yrs. School^2	0.003*	(0.2E-3)	0.001*	(0.2E-3)	0.001*	(0.1E-3)
Training	0.060*	(0.010)	0.023*	(0.007)	0.036*	(0.006)
Other Income	0.002	(0.003)	-0.001	(0.001)	-0.002*	(0.3E-3)
Weeks Worked[a]						
Wks 14-26	0.755*	(0.023)	0.909*	(0.014)	0.768*	(0.013)
Wks 27-39	1.165*	(0.022)	1.285*	(0.015)	1.111*	(0.013)
Wks 40-48	1.457*	(0.022)	1.584*	(0.014)	1.378*	(0.013)
Wks 49-52	1.554*	(0.020)	1.692*	(0.013)	1.502*	(0.012)
Full Time	0.401*	(0.016)	0.478*	(0.011)	0.623*	(0.010)
Self-Employed	-0.069*	(0.013)	-0.111*	(0.009)	-0.143*	(0.007)
Mother Tongue Fr	-0.038	(0.028)	-0.002	(0.023)	0.057*	(0.022)
Lamda	0.019	(0.027)	-0.012	(0.019)	0.072*	(0.017)
Selected N	28,022		69,916		122,237	
Total N	36,105		89,037		155,103	
R^2	0.511		0.502		0.421	

[a] Omitted variables are: Region (Ontario), Household (Not Related), Marital Status (Single), Religion (None), Birth (Ontario), Ethnicity (Other). The equations include (not shown) 9 industry and 14 occupational variables.

* Significant at the 5 percent level.

Table 13a Selection-Corrected Log Earnings Equations for Bilingual Females: 1971, 1981 and 1991

	Census Year					
	1971		1981		1991	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Constant	6.260*	(0.273)	6.455*	(0.151)	6.483*	(0.105)
Region[a]						
Atlantic	-0.253*	(0.051)	-0.016	(0.028)	-0.109*	(0.020)
Quebec	-0.038	(0.028)	0.085*	(0.017)	-0.055*	(0.012)
Prairie	-0.254*	(0.060)	-0.001	(0.036)	-0.155*	(0.027)
West	-0.087	(0.053)	0.073*	(0.026)	-0.057*	(0.020)
Experience	0.021*	(0.032)	0.019*	(0.002)	0.026*	(0.002)
Experience^2	-0.3E-3*	(0.7E-4)	-0.3E-3*	(0.4E-4)	-0.4E-3*	(0.3E-4)
Household[a]						
Head	0.072	(0.047)	-0.122*	(0.033)	-0.033*	(0.015)
Child	-0.039	(0.045)	-0.074*	(0.027)	-0.129*	(0.022)
Relative	-0.034	(0.073)	-0.079*	(0.040)	-0.070*	(0.034)
Urban	0.064*	(0.027)	0.065*	(0.016)	0.135*	(0.012)
Marital Status[a]						
Married	-0.034	(0.041)	0.085*	(0.036)	0.001	(0.015)
Other	-0.142*	(0.043)	0.037	(0.031)	0.019	(0.016)
Yrs. School	-0.075*	(0.017)	-0.059*	(0.015)	0.022*	(0.008)
Yrs. School^2	0.005*	(0.001)	0.004*	(0.001)	0.001*	(0.2E-3)
Training	0.080*	(0.031)	0.006	(0.023)	-0.030	(0.016)
Other Income	0.015	(0.014)	0.007*	(0.003)	-0.003*	(0.001)
Weeks Worked[a]						
Wks 14-26	0.919*	(0.046)	1.001*	(0.027)	0.905*	(0.025)
Wks 27-39	1.312*	(0.047)	1.440*	(0.029)	1.290*	(0.026)
Wks 40-48	1.677*	(0.046)	1.780*	(0.028)	1.572*	(0.024)
Wks 49-52	1.773*	(0.040)	1.966*	(0.024)	1.747*	(0.022)
Full Time	0.580*	(0.030)	0.574*	(0.016)	0.624*	(0.012)
Self-Employed	-0.032	(0.065)	-0.089	(0.036)	-0.064*	(0.021)
Mother Tongue Fr	-0.034	(0.037)	0.002	(0.021)	-0.004	(0.015)
Lamda	-0.119*	(0.035)	0.3E-3	(0.022)	0.003	(0.017)
Selected N	3,629		11,492		25,668	
Total N	19,667		61,127		128,772	
R^2	0.588		0.597		0.498	

[a] Omitted variables are: Region (Ontario), Household (Not Related), Marital Status (Single), Religion (None), Birth (Ontario), Ethnicity (Other). The equations include (not shown) 9 industry and 14 occupational variables.

* Significant at the 5 percent level.

Table 13b Selection-Corrected Log Earnings Equations for Unilingual Females: 1971, 1981 and 1991

	Census Year					
	1971		1981		1991	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Constant	5.092	(0.109)	5.986*	(0.067)	6.484*	(0.047)
Region[a]						
Atlantic	-0.222*	(0.020)	-0.023	(0.012)	-0.116*	(0.009)
Quebec	0.033	(0.030)	0.062*	(0.025)	-0.025	(0.022)
Prairie	-0.137*	(0.020)	0.023	(0.012)	-0.123*	(0.009)
West	-0.033*	(0.015)	0.151*	(0.009)	-0.018*	(0.007)
Experience	0.016*	(0.002)	0.018*	(0.001)	0.023*	(0.008)
Experience^2	-0.2E-3*	(0.3E-4)	-0.3E-3*	(0.2E-4)	-0.4E-3*	(0.2E-4)
Household[a]						
Head	0.128*	(0.024)	-0.068*	(0.017)	-0.053*	(0.009)
Child	0.012	(0.022)	-0.102*	(0.015)	-0.146*	(0.012)
Relative	0.115*	(0.037)	-0.006	(0.021)	-0.031	(0.018)
Urban	0.092*	(0.012)	0.044*	(0.007)	0.105*	(0.006)
Marital Status[a]						
Married	0.039	(0.021)	0.042*	(0.019)	0.009	(0.009)
Other	-0.041	(0.022)	0.024	(0.017)	0.031*	(0.010)
Yrs. School	-0.011	(0.009)	-0.012	(0.008)	0.027*	(0.005)
Yrs. School^2	0.003*	(0.4E-3)	0.002*	(0.3E-3)	0.001*	(0.2E-3)
Training	0.044*	(0.015)	-0.022*	(0.011)	-0.006	(0.008)
Other Income	0.008	(0.005)	-0.011*	(0.001)	-0.001	(0.001)
Weeks Worked[a]						
Wks 14-26	0.986*	(0.021)	1.032*	(0.013)	0.898*	(0.012)
Wks 27-39	1.435*	(0.021)	1.436*	(0.014)	1.284*	(0.013)
Wks 40-48	1.766*	(0.021)	1.764*	(0.013)	1.542*	(0.012)
Wks 49-52	1.911*	(0.018)	1.970*	(0.011)	1.729*	(0.010)
Full Time	0.662*	(0.014)	0.597*	(0.008)	0.621*	(0.006)
Self-Employed	-0.096*	(0.031)	-0.093*	(0.017)	-0.129*	(0.011)
Mother Tongue Fr	-0.166*	(0.039)	0.009	(0.029)	-0.049*	(0.024)
Lamda	-0.136*	(0.043)	-0.051	(0.027)	-0.014	(0.020)
Selected N	16,038		49,635		103,104	
Total N	19,667		61,127		128,772	
R^2	0.628		0.586		0.487	

[a] Omitted variables are: Region (Ontario), Household (Not Related), Marital Status (Single), Religion (None), Birth (Ontario), Ethnicity (Other). The equations include (not shown) 9 industry and 14 occupational variables.

* Significant at the 5 percent level.

Table 14 Coefficients and Standard Errors on Mother Tongue French Variable from OLS Log Earnings Equations

	Census Year					
	1971		1981		1991	
	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.
Males						
Bilingual	-0.054*	(0.017)	-0.014	(0.011)	0.5E-4	(0.010)
Unilingual	-0.048*	(0.022)	0.004	(0.020)	0.027	(0.020)
Females						
Bilingual	0.051	(0.028)	0.002	(0.015)	-0.006	(0.011)
Unilingual	-0.092*	(0.031)	0.035	(0.025)	-0.042	(0.022)

* Significant at the 5 percent level.

Table 15 Summary of Returns on Bilingualism and Mother Tongue (log points)

	Male			Female		
	1971	1981	1991	1971	1981	1991
(a) No Selection: Based on Tables 2 and 3						
All						
Bil eng	0.025	0.030*	0.024*	0.000	0.028*	0.036*
Unil fr	-0.059*	-0.010	-0.011	-0.061*	0.004	-0.023*
Bil fr	-0.013	0.018*	0.032*	0.041*	0.034*	0.029*
(b) No Selection: Based on Table 4						
Quebec						
Bil eng	0.058	0.040	0.093*	-0.000	0.043	0.016
Unil fr	-0.102*	-0.016	0.033	-0.069	0.013	-0.034
Bil fr	-0.039	0.018	0.105*	0.008	0.057	0.036
Ontario						
Bil eng	0.005	0.027	0.030*	0.032	0.055*	0.058*
Unil fr	0.014	0.069	0.092	-0.056	0.043	-0.078
Bil fr	0.026	0.037*	0.019	0.096*	0.037	0.028
(c) Selection: Based on Tables 12a to 13b[a]						
Quebec						
Bil eng	0.089	0.114	0.112	0.104	0.125	0.028
Unil fr	-0.038	-0.002	0.057#	-0.166#	0.009	0.049#
Bil fr	0.027	0.068	0.103	0.070	0.127	0.024
Ontario						
Bil eng	0.095	0.105	0.084	0.174	0.102	0.058
Unil fr	-0.038	-0.002	0.057#	-0.166#	0.009-	0.049#
Bil fr	0.033	0.059	0.076	0.140	0.104	0.054

[a] The rows for Unil fr are obtained directly from Tables 12b and 13b. The symbol # indicates significance at the 5% level; since we do not report standard errors for the constructed coefficients in part (c) of the Table, we indicate significance with a # in order to remind the reader that no statement on the statistical significance of the remaining coefficients in part (c) is being made. Results in section (c) may differ from those in Tables 12a to 13b due to rounding errors.

Table 16 Returns to Bilingualism and Mother Tongue: Tables 12a to 13b in Table 5 format (Ontario ROC ; log points)[a]

Language Variables	Males 1971	Males 1981	Males 1991	Females 1971	Females 1981	Females 1991
Unil eng* Que	-0.034	0.006	-0.098	0.033	0.062	-0.025
Bil eng* Ont	0.095	0.105	0.084	0.174	0.102	0.058
Bil eng* Que	0.055	0.121	0.014	0.137	0.187	0.003
Unil fr* Ont	-0.038	-0.002	0.057	-0.166	0.009	-0.049
Unil fr* Que	-0.072	0.005	-0.041	-0.133	0.071	-0.074
Bil fr* Ont	0.033	0.059	0.076	0.140	0.104	0.054
Bil fr* Que	-0.007	0.074	0.004	0.102	0.189	-0.001

[a] Results in this table may differ from those in Tables 12a to 13b due to rounding errors.

BIBLIOGRAPHY

Bloom, D.E. and G.Grenier. "Earnings of the French Minority in Canada and the Spanish Minority in the United States", in B.R. Chiswick (ed.) *Immigration, Language, and Ethnicity: Canada and the United States*. Washington, D.C.: The AEI Press, 1992.

Bloom, D.E., G.Grenier and M.Gunderson. "The Changing Labour Market Position of Canadian Immigrants". *Canadian Journal of Economics*, Vol. XXVII, No. 4b, 1995, 987–1005.

Boulet, J.A. *Language and Earnings in Montreal*. Hull, Quebec: Economic Council of Canada, 1980.

Breton, A. *Bilingualism: An Economic Approach*, Montreal: C.D. Howe Research Institute, 1978.

Breton, A. and P. Mieszkowski. "The Economics of Bilingualism", in W.E. Oates (ed.) *The Political Economy of Federalism*. Lexington, Massachusetts: Lexington Books, 1977.

Chiswick, B.R. and P.W. Miller. "Earnings in Canada: The Roles of Immigrant Generation, French Ethnicity, and Language", in T.P. Shultz (ed.) *Research in Population Economics*. Greenwich, Connecticut: JAI Press Inc., 1988.

Chiswick, B.R. and P.W. Miller. "Language in the Immigrant Labor Market", in B.R. Chiswick (ed.) *Immigration, Language, and Ethnicity*. Washington, D. C.: The AEI Press, 1992.

Grenier, G. "Earnings by Language Group in Quebec in 1980 and Emigration from Quebec Between 1976 and 1981". *Canadian Journal of Economics* 20, 1987, 774–91.

Halvorsen, R. and Palmquist. "The Interpretation of Dummy Variables in Semilogarithmic Equations". *American Economic Review* 70, 1980, 474–5.

Heckman, J. "Sample Selection as a Specification Error". *Econometrica* 47, 1979, 153–62.

Lee, Lung-Fei. "Generalised Econometric Models With Selectivity". *Econometrica* 51, 1983, 507–12.

McManus, W.S. "Labor Market Costs of Language Disparity: An Interpretation of Hispanic Earnings Differences". *American Economic Review*, Vol. 75, No. 4, 1985, 818–827.

Rivera-Batiz, F.L. "English Language Proficiency and the Economic Progress of Immigrants". *Economics Letters* 34, 1990, 295–300.

Robinson, C. "Language Choice: The Distribution of Language Skills and Earnings in a Dual-Language Economy", in R.G. Ehrenberg (ed.) *Research in Labor Economics.* Greenwich, Connecticut: JAI Press Inc., 1988.

Shapiro, D.M. and M. Stelcner. "The Persistence of the Male-Female Earnings Gap in Canada, 1970-1980: The Impact of Equal Pay Laws and Language Policies". *Canadian Public Policy*, Vol. XIII, No. 4, 1987, 462–476.

Vaillancourt, F. "An Economic Perspective on Language and Public Policy in Canada and the United States", in B.R. Chiswick (ed.) *Immigration, Language, and Ethnicity: Canada and the United States*. Washington, D.C.:The AEI Press, 1992.

APPENDIX

Definition of Variables: All variables are constructed from data obtained from the individual public use microdata files of the 1971, 1981 and 1991 Census.

Log Earnings: The natural log of gross annual earnings from wages and salaries and self-employment.

Age: Age in years.

Experience: Work experience in years calculated as (AGE-YEARS OF SCHOOLING-6).

Years School: Number of years of schooling using mid-range values. In the final, open bracket category, Yrs School is assumed to be 20.

Region: A set of five dummy variables representing regions (1) Atlantic (2) Quebec, (3) Ontario, (4) Prairie (Manitoba and Saskatchewan), and (5) West (Alberta and British Columbia), with Ontario serving as the reference region.

Urban: Coded as one if the individual resided in a CMA, otherwise zero. In 1971, observations were coded as one if place of residence was urban (30,000 and over).

Marital Status: A set of three dummy variables representing (1) Married (not separated) status, (2) Other (separated, divorced or widowed status), and (3) Single (never married status), with single serving as the reference status.

Household: A set of four dummy variables representing (1) Head of household, (2) Child of the head, (3) Relative of the head, and (4) Unrelated individual, with Unrelated individuals within the household serving as the reference category.

Religion: A set of six dummy variables representing (1) Protestant, (2) Catholic, (3) Orthodox, (4) Eastern, (5) Jewish, and (6) None, with None serving as the reference category.

Weeks Worked: Number of weeks worked categorized as (1) Wks 1–13, (2) Wks 14–26, (3) Wks 27–39, (4) Wks 40–48, and (5) Wks 49–52, with Wks 1–13 serving as the reference category.

Training: Coded as one if individual received vocational training.

Full-Time: Coded one if individual worked mainly full time weeks.

Self-Employed: Coded one if class of worker is self-employed.

Other Income: Total income minus earned income from wages and salary and self employment.

Language: A set of four dummy variables representing mother tongue and official language (1) English/English (Unil eng), (2) French/French (Unil fr), (3) English/Bilingual (Bil eng), and (4) French/Bilingual (Bil fr), with Unil eng serving as reference language category in most tables.

Mother Tongue Fr: A dummy variable which takes the value of 1 when mother tongue is French. English mother tongue is, implicitly, the reference category.

Occupation: A set of 15 dummy variables representing the following 1971 occupational classification: (1) Manager; (2) Natural Science; (3) Social Science; (4) Teaching; (5) Medicine; (6) Artistic; (7) Clerical; (8) Sales; (9) Service; (10) Primary; (11) Processing; (12) Product Fabrication; (13) Construction; (14) Transportation; (15) Miscellaneous, with Miscellaneous serving as the reference category.

Industry: A set of 13 dummy variables representing the following industries using the 1980 standard industrial classification: (1) Agriculture; (2) Mining; (3) Manufacturing; (4) Construction; (5) Transportation; (6) Trade; (7) Finance; (8) Service; (9) Education*; (10) Health*; (11) Utilities*; (12) Public; (13) Other, with Agriculture serving as the reference industry. The notation * indicates that industries enter into the 1981 and 1991 equations only.

Birth: A set of six dummy variables identifying place of birth: (1) Maritimes; (2) New Brunswick; (3) Quebec; (4) Ontario; (5) Prairie, i.e Manitoba and Saskatchewan; (6) West, i.e. Alberta, British Columbia and Yukon/NWT, with Ontario serving as the reference category.

Ethnicity: For 1971 and 1981, a set of dummy variables representing individuals who are ethnically (1) British; (2) French; (3) West and South European; (4) East European; (5) All Other Ethnic groups, with the last group serving as the reference category. In the 1991 Census, in addition to categories (1) and (2) above, a new census category "Canadian" is introduced and the category "European" replaces categories (3) and (4) in the 1971 and 1981 data; category (5) continues to serve as the reference group.

5. BILINGUALISM IN EMPLOYEE RECRUITMENT AND THE ROLE OF SYMBOLIC ANALYSTS IN LEADING EXPORT-ORIENTED FIRMS

Harold Chorney
Public Policy
Concordia University

INTRODUCTION

In a previous paper for the Department of Canadian Heritage I attempted to blend a political economy analysis with social theory to address the issue of linguistic duality, democracy and the contribution that it has made and continues to make to the Canadian economy. In this report I test in a more formal way some of the arguments that I asserted in a speculative fashion in the original paper. In order to guide the reader to the statistical results that we have mined from the wealth of company data we have accumulated over the past ten months of field work, it is useful to recapitulate the essence of the argument that I made in the previous paper.

SOME PRELIMINARY EVIDENCE

The economic benefits of our official languages policy are far greater than we might expect. In the modern world it is increasingly clear that none of the old suppositions about economic growth and human development are going to remain unchanged. Indeed the pace of change is now breathtaking as computerized technology and micro-electronics transform the nature of everyday life. In such a fast changing world, nation-states and, more importantly, the individuals that compose them can increase their economic security and material welfare by being as supple as possible in meeting the challenges of the global economy. Of course, there is a faddist degree of cliché in this statement. But like most clichés it contains many important elements of truth.

The very act of acquiring knowledge and linguistic competence has a positive disproportional impact on the economic potential of an individual.[1] Furthermore it contributes to the likelihood that the individual can make a greater contribution to society. Quite literally the capacity to participate in one's society is considerably enhanced. As central Europeans often say "the more languages you speak the more times you are a human being."

The first step toward that competence is learning the language and becoming comfortable in using it to articulate one's view of the world. Hence, developing communicative competence in both of the official languages of Canada offers returns to the investment involved that go well beyond the normal ones that individuals expect. Not only does the individual benefit, but the society as a whole and the political economy that is the product of that society benefit as well.

Research on the cognitive and socio-cultural consequences of becoming bilingual has established that, contrary to the earlier conventional wisdom that the consequences might be negative, the results are very positive. For example, a now classic study by Elizabeth Peal and Wallace Lambert (1962) of McGill University found that bilingual children showed significant improvements in their cognitive performance.[2] In a later study Lambert argued that "bilingual children, relative to monolingual controls, displayed greater cognitive flexibility, creativity and divergent thought."[3] Such divergent thought reflected a richer imagination, a more flexible capacity to manipulate the linguistic code and more advanced performance on tests of concrete operational thinking. Bilingual children display "a definite advantage in the domain of cognitive flexibility."

---

[1] This notion of communicative competence is at the heart of a fascinating and powerful argument made by the political and social theorist Jurgen Habermas. For a more in-depth exploration of the application of this theory to official languages, see Harold Chorney, "The Economic Benefits of Linguistic Duality and Bilingualism: A Political Economy Approach, *New Canadian Perspectives: Official Languages and the Economy*, Canadian Heritage, 1997, p. 181.

[2] E. Peal and W. Lambert, "The Relation of Bilingualism to Intelligence", *Psychological Monographs*, 76, 1–23.

It is this increase in cognitive flexibility and creativity that enhances the society overall and in particular the nature of its linguistic and cultural discourse. Lambert establishes that bilingual Canadian children have their sense of appreciation for the other language group deepened and enhanced as well as their own identification with their original linguistic group strengthened. Their capacity for understanding cultural differences and communicating is increased. Lambert's conclusions have been reinforced by more recent work. The conclusions of the majority of studies done since Lambert and his colleagues reached these optimistic conclusions about the properties of bilingual education agree with his results. The cognitive consequences of bilingual education are clearly positive.

Almost all the researchers agree with Lambert's assessment that:

The picture that emerges of the bilingual is that of the youngster whose wider experiences in two cultures have given him advantages which a monolingual (student) does not enjoy. Intellectually his(her) experience with two language systems seems to have left him with a mental flexibility, a superiority in concept formation, and a more diversified set of mental abilities.[4]

Reynolds has carried this argument further recently in 1991 when he suggested the possibility that there might be a relationship between the positive cognitive consequences of bilingualism at the individual level and the spillover of this to the social level. In a way that presages something of what I am arguing, Reynolds suggests drawing upon

---

[3] Wallace Lambert, "Effects of Bilingualism on the Individual: Cognitive and socio-cultural Consequences," in P.A. Hornby, *Bilingualism: Psychological, Social and Educational Implications*, New York: Academic Press, 1974, p.16. See also Peter Homel et al., *Childhood Bilingualism: Aspects of Linguistic, Cognitive and Social Development*, Hillsdale, N.J: Lawrence Erlbaum Associates, 1987.

[4] A. Reynolds, "The Cognitive Consequences of Bilingualism", in A. Reynolds, *Bilingualism, Multiculturalism and Second Language Learning*, p.177

BEST COPY AVAILABLE

research by McClelland et al on the achievement principle and Protestantism that bilingualism may promote the growth of a knowledge-oriented, achievement-oriented society. He concludes that the "hypothesized relationship between societal bilingualism and national intellectual vitality is deserving of exploration."[5] This is precisely what I have attempted to do in my own research.

Communicative competence is enhanced and public discourse enriched in a society that advances bilingualism: a more vibrant democracy with stronger webs of social affiliation becomes possible. It is this kind of democracy that has been constructed in Canada over the past few decades that now stands ready to bear very positive fruit for the twenty-first century. Canada as a country, despite a long history of disagreement and some considerable tension over language, culture and nationality, has evolved a highly sophisticated method of conflict resolution and communicative interchange that is considerably strengthened by the numbers of Canadians who speak both of our official languages. A very large side benefit or positive externality associated with this development is the contribution this linguistic duality and increasing communicative competence has for our economic well-being, our capacity to innovate and adapt and be open to a broad range of cultural difference.

This kind of society, where at present as many as 4.5 million people out of a population of 30 million speak both official languages, is more open to critical understanding, more supple in its appreciation of different ways of problem solving and more stimulated to becoming involved. This then creates a more dynamic cultural milieu that is receptive to economic innovation and experimentation.

In such an environment, economic growth is much more likely to occur and to flourish than in an environment that restricts part of the population because of linguistic difference. Of course, in a homogeneous society the cost is less obvious. That is so because it is possible, though probably more difficult, to teach the values of accommodation to new ideas and openness to innovation and diversity to an otherwise homogeneous language group. But even if the learning curve is somewhat steeper than in a diverse heterogeneous society, at least there is no one group within the labour force whose talents risk being excluded and whose contribution to economic growth thereby lost.

---

[5] *Ibid.* pp. 171–175.

In a society with large linguistic minorities, failure to promote equal treatment of the language of the minority involves losing the contribution that the minority group can make to overall value added in human capital. Instead you have either unemployed or underemployed factors of production. This undermines the overall productivity of the economy. This problem of minority access to the mainstream of society applies in Quebec for the English minority as it does for Francophones in the rest of Canada. So the positive benefits of our official languages policy are economic, cultural and socio-political.

I would argue that productivity in the workplace can be related in part to general satisfaction with one's position in society. Consequently, our policy of linguistic duality strengthens our economic performance. The oft-repeated prejudice that bilingualism is costly ignores this critical linkage between the healthy functioning democracy and the policy of linguistic duality including recognition of the rights of linguistic minorities and the direct impact this has upon our overall productivity as an economy. For the productivity of employees depends "not only on their ability and the amount invested in them both on and off the job but also on their motivation, or the intensity of their work."[6] Motivation, of course, is largely influenced by the financial rewards associated with work, but one's general level of satisfaction, one's sense of belonging and having faith in the society, also plays an important role.

Costs associated with providing minority language services, bilingual education or services in both languages may be outweighed by the benefits that flow from a stronger sense of political efficacy and democratic participation. In other words, investment by the federal government in our official languages policy is investment not only in the stability of our political future as a country, but investment in our economic potential as well.

---

[6] Gary Becker, *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*, New York: Columbia University Press, 1964, p.36.

HUMAN CAPITAL THEORY AND THE SUPPLY OF LABOUR

Another way of assessing the contribution of linguistic duality to our economy is through the use of the concept of human capital. Human capital can be understood as those attributes of workers that are capable of being enhanced through skill development, training and education. One of the founders of human capital theory, Gary Becker, defined investment in human capital as "activities that influence future monetary and psychic income by increasing the resources in people."[7]

The contribution of human capital to economic growth is clearly developed and demonstrated. The residual amount of economic growth that remains after investment in physical capital and technological change is accounted for is attributable to human capital. In general, "it is argued that the more highly educated and skilled persons always tend to earn more than others."[8] Periods of rapid technological innovation are also periods in which the distribution of human capital rapidly changes. Some skills and education can lose value while others can rapidly gain in value. This can have profound consequences for people and their attachment to the labour force.

THE KNOWLEDGE ECONOMY AND THE INTELLECTUAL STIMULUS OF LINGUISTIC DUALITY

In recent years there has been an explosion of new information technologies that have revolutionized the way we do business and carry on economic activities. All of the new electronic devices require a certain level of skill to design and to operate. They have also had an important impact on more traditional methods of communication. Most importantly they have led to a major restructuring of employment patterns in advanced industrial societies like Canada. What is clear about the new technology and the jobs associated with it is that education and skill level are increasingly important.

---

[7] *Ibid.*, p.1.

[8] *Ibid.*, p.2.

To the extent that knowledge of another language is evidence of greater skills and makes the worker more adaptable, then a policy that promotes greater linguistic knowledge is likely to increase the flexibility of our work force. The American Secretary of Labour, Robert Reich, made his fame as an academic by writing a series of controversial books that argued the wealth of nations would increasingly reflect the extent to which they welcomed highly skilled, well-educated, information-focused workers. This new class of workers, which Reich has called symbolic analysts, are mobile, contribute greatly to value added and are extremely flexible. Increasingly they will receive higher incomes and better job opportunities because of the scarcity value of their human capital. Strong growth economies will be ones in which symbolic analysts thrive and are a growing proportion of the overall labour force.

Reich defines symbolic analysts as people who work at:

> (...) problem solving, problem identifying, and strategic brokering. [The services they produce] do not enter the world of commerce as standardized things. Traded instead are the manipulation of symbols—data, words, oral and visual representations (...). Symbolic analysts solve, identify, and broker problems by manipulating symbols. They simplify reality into abstract images that can be rearranged, juggled, experimented with, communicated to other specialists, and then, eventually transformed back into reality. The manipulations are done with analytic tools, sharpened by experience. (...) Symbolic analysts often work alone or in small teams, which may be connected to larger organizations, including worldwide webs. Teamwork is critical (...). When not conversing with their teammates, symbolic analysts sit before their computer terminals examining words and numbers, moving them, altering them, trying out new words and numbers, formulating and testing hypotheses, designing or strategizing.[9]

Clearly, language skills are a very important aspect of the work of symbolic analysts. I suggest that people who learn other languages are much more likely to succeed as symbolic analysts. Moreover, to the extent that Canada operates as a country in which linguistic duality is valued, we are more likely to create the kind of climate in which symbolic analysts thrive. This is bound to have a very positive impact upon our rate of growth and the creation and maintenance of high-quality, well-paid jobs.

---

[9] Robert Reich, *The Work of Nations*, New York: Random House, 1991, pp. 163–164

THE ROLE OF BILINGUAL EDUCATION: A CAPITAL AND PUBLIC GOODS APPROACH

The research of Albert Breton on bilingualism has drawn heavily upon this approach.[10] Breton works within the tradition established by Anthony Downs (1957), James Buchanan and Gordon Tullock (1974), and Mancur Olson (1971), and himself (1974), which seeks to apply micro-economic notions and the insights of neo-classical welfare economics to political actions, power seeking and democracy. In order to work on the problem of assessing the economic aspects of bilingualism from this perspective, it is necessary to view the acquisition of a second language as a capital good in which people invest. In certain circumstances this capital good can resemble a public good or a near-public good.

A pure public good is defined as any good whose consumption by one person in no way diminishes what is available to others and a good to which there is no serious restricted access. Obviously, learning Canada's other official language is not strictly speaking a pure public good. Learning another language is not without personal cost, as well as reward. However, some of the consequences of spreading bilingual skills in the Canadian population resemble those that flow from the provision of public goods. We can think of these consequences as positive external effects that go beyond the private rewards that individuals obtain from learning another language.

---

[10] A. Breton, "Reflections on Some Economic Aspects of Bilingualism" in *New Canadian Perspectives: Official Languages and the Economy*, Canadian Heritage, 1997; *The Economic Theory of Representative Democracy*, Chicago: Aldine Publishing House, 1974; James Buchanan and Gordon Tullock, *The Calculus of Consent*, Ann Arbour: University of Michigan Press, 1962; Mancur Olson, *The Logic of Collective Action*, Cambridge, Mass. Harvard University Press, 1971; Anthony Downs, *An Economic Theory of Democracy*, New York: Harper, 1957; and Peter Bohm, *Social Efficiency: A Concise Introduction to Welfare Economics*, London: The Macmillian Press, 1973.

The fact that one must invest in the acquisition of this knowledge involves both direct and opportunity costs. People do so because there are rewards from doing so that directly enhance their welfare or sense of well-being. In this the federal government and its language support programmes play an important role of subsidization to provide the necessary incentives for a more socially optimal outcome.

According to the theory about linguisitic competence, there are clear positive externalities associated with the rise in general competence in a second language that may justify whatever subsidy is involved. Rising bilingualism produces an outcome similar to that provided by the provision of public goods like universally accessible public education, law and order or public transportation or other basic infrastructure. Since these benefits occur to society as a whole, they cannot be captured in considering only the personal utility maximization preferences of a given individual. For example, a bilingual society is one in which democratic participation is enhanced and feelings of belonging are spread more widely. As such, they are not accurately reflected in an individual's preference function as opposed to a social preference function.

Because of this fact, eliminating those programmes that increase or support bilingualism on the basis of individual preference functions would underestimate the cost to society of choosing to cut these programmes. The true value can only be appreciated by a consideration of the whole impact upon society. We must therefore include the social welfare function in the calculation.

Because of externalities, the social welfare function is more than simply the sum of its individual parts. Acquisition of the other official language clearly involves positive external benefits. As well it may generate some negative ones in the form of resentments from those individuals who might feel excluded. These resentments can be partly overcome through a system that assists individuals to acquire these skills. So for example, when faced with hostility from unilingual Canadians it might be possible to win them over with free or subsidized second language education or cultural exchanges. This kind of resentment is less likely to be a problem among younger Canadians who are more open to learning a second language.

Because of the level of positive externalities that flow from a policy of promoting bilingual education, there is scope for the Government to spend money on compensating programmes that reduce the impact of the negative effects. I do not pursue this approach any further in this paper although clearly it has considerable potential. See the work of Albert Breton on this approach.

THE COMPARATIVE ADVANTAGE IN INTERNATIONAL TRADE

The trend toward global production and trade liberalization means that Canada is increasingly dependent upon international trade for its economic growth. Currently the economic growth in our economy is largely fueled by international trade and the export sector. In theory our policy of linguistic duality should make us more open to our prospective trading partners and equip us to be more sensitive to the need to master other languages in order to engage in trade. The two official languages of Canada, English and French, are both widely used internationally.[11] For instance, there are major Francophone countries in Africa and Europe. Our linguistic duality makes us potentially a more attractive partner for many European countries than our immediate neighbor, the United States. For many Europeans, Americans are seen as unwilling to learn other languages and therefore insensitive to other cultural influences.

The growth of knowledge-based industries that have significant symbolic analytical content will increase in international trade in the years to come. If we are to continue to prosper from our trade and extract the maximum economic rents from our resource base we must seek to maximize symbolic analytical content in the goods and services in which we trade. This will increase our national wealth and job opportunities for our citizens. To the extent that our policy of linguistic duality improves the climate for symbolic analysts, our trading potential will be increased accordingly.

---

[11] Canadian Heritage, *The Economic Benefits of Linguistic Duality and Bilingualism*, Ottawa: Feb. 13 1995, (Draft) p.12.

BENEFITS OF BILINGUALISM IN JOB SEARCH: PRELIMINARY EVIDENCE

Education, in general, is best understood in economic terms as investment in human capital. The bundle of attributes associated with a skilled or well-educated worker must clearly include language skills. As such, one would expect that knowledge of both of the official languages of the country, with the accompanying cognitive changes, is a clear asset with employers. To test this proposition, I undertook an unscientific sample of some of the largest firms in five industries. These industries included construction, automobile manufacturing, banking, pharmaceuticals, and retail merchandising and manufacturing. In each case, leading firms were selected and their human resources department contacted. A brief telephone interview was held to discuss whether or not bilingual skills were considered an asset by the company in their hiring policy.

The results of these surveys (See Table 1) confirmed that from the point of view of the employee, bilingualism is a clear asset that helps workers secure a position. The firms that were sampled account for

Table 1 Bilingual Skills in Job Recruitment

Industry	Construction	Auto Manufacturing	Banking and Finance	Pharmaceuticals	Retail Trade
1. Are bilingual language skills considered an asset when recruiting employees?	Yes	Yes	Yes	Yes	Yes
2. Outside of Quebec are they considered an asset?	Yes	Yes	Yes	Yes	Yes
3. Are bilingual staff paid more?	No	No	No	No	No
4. Are bonuses paid to staff who become bilingual?	No	No	No	No	No

Table 2 Persons aged 15+ not attending school fulltime reporting English/French as mother tongue by ability to speak English/French/both by labour force status (in percentages*)

Region	English Mother Tongue			French Mother Tongue		
	Canada	Canada excluding Que.	Quebec	Canada	Canada excluding Que.	Quebec
Labour Force Participation Rate in Group						
Total	83	83	78	78	79	78
English only	83	83	70	78	79	100
French only	72	—	71	72	—	73
Bilingual	86	88	82	84	81	85
Unemployment Rate in Group						
Total	9	9	11	11	11	11
English only	9	9	14	12	12	0
French only	0	—	0	13	—	12
Bilingual	8	7	10	9	10	8
Employed as % of Total Population in Group						
Total	76	76	69	69	70	69
English only	75	75	60	69	70	63
French only	63	—	61	63	—	64
Bilingual	80	82	74	77	73	78

Source: 1991 Census of Canada, Public Use Sample.

*: Numbers are rounded to the nearest percentage.

some 120,000 jobs. While bilingualism was rated as an asset, in none of the cases did it appear to involve higher pay. However, bilingualism was clearly an asset in gaining and retaining a job in the firms we surveyed. This applied not only in Quebec but elsewhere in the country as well. Perhaps the most insightful comment of one employer was that having bilingual skills in a rapidly changing world made employees much more flexible and more valuable to the company in their capacity to adapt. A number of firms stated that bilingualism was required of employees dealing with the public in Quebec and New Brunswick. Other firms stated that knowledge of French was a requirement in Quebec. Several firms stated that in British Columbia knowledge of Mandarin or Cantonese was a definite asset. Some firms, while not paying special bonuses for bilingual capacities, did however provide educational assistance to employees seeking to improve their second language skills.

There is other concrete evidence that shows that bilingualism has a significant impact upon access to employment. There are, according to the 1991 Census, higher rates of labour market participation, employment and lower rates of unemployment among bilingual people in Canada. The salient aspects of this data are reproduced in the following table.

A FORMAL TEST OF THE HYPOTHESES: SOME EVIDENCE

In order to test more carefully the propositions outlined above, a stratified sample was made of the leading 250 companies in Canada. These were assessed on the basis of the size of their export sales, degree of high technology utilization and status as dynamic companies experiencing high growth according to business journals and company guides.

The sample was drawn principally from the Department of Industry's Business Opportunities Sourcing System (BOSS) list of top exporting companies. The BOSS list yields firms whose exports were in excess of $50 million per year. While the final population of companies that was assembled is not exhaustive, it is reasonably representative of the leading firms as might be described by Reich and other analysts. To enhance the population we supplemented the BOSS list by research in

The Globe and Mail Report on Business Top 1000 companies, the annual census of manufactures, exports by commodity and country reports, industry and firm profiles, and research in the financial press generally.

In our assembly of the list we paid attention to companies described in the press as high technology growth companies on the cutting edge of innovation and growth. The issue of how companies can be classified according to high, medium and low technology is a complex issue that involves an extensive literature that we need briefly to assess before proceeding further.

HIGH, LOW AND MEDIUM TECHNOLOGY: THE BASIS OF OUR METHODOLOGY

The kind of analysis that we have undertaken above places the emphasis upon knowledge workers and the increasing role that they play in the economy and within the structure of leading-edge firms. Thus one can rank industries by the proportion of their workers who are knowledge workers/symbolic analysts or by the percentage of their budget that they devote to research and development. There is also another approach to distinguishing high from medium and low technology companies. This involves measuring industries by the proportion of high-tech non-labour labour inputs embodied in final goods and services. Finally, one can combine the two methods and use a weighted average of the two. The resulting lists are then ranked and divided into three: high, medium and low.[12]

Because there is no commonly agreed-upon definition of high technology, the rankings are subject to some disagreement and are themselves very sensitive to the classification method that is used.

---

[12] We have been guided in our work by extremely useful papers prepared in the federal departments of Finance and Industry, *Employment Growth in High-Tech and Knowledge Industries: An Update* by Shane Williamson (April 11, 1996). This paper in turn builds upon the research of Graham Rose in the Department in 1992, *Employment Growth in High-Tech and Knowledge Industries* (Nov. 30, 1992). We also received important guidance in this area from Surendra Gera from Industry Canada who is the co-author of a third major study on this issue, *The Knowledge Based Economy: Shifts in Employment* (1996), with Philippe Massé of Human Resources Canada.

Williamson points out that education ranks in the top third when industries are ranked by intensity of high knowledge workers, but in the bottom third when the rankings are done by non-labour inputs.

It seems clear that the best approach is to combine methodologies. It should be noted that there is considerable variation within the industry. An industry can be ranked high technology, but there will be a range of firms within it from low to high. Similarly, an industry can be ranked low technology but there will be a range of firms within it. In classifying firms within our own study we used the classification scheme arrived at by Rose and Williamson. This guided us in our selection of firms.

Morever, the finding of considerable variation within an industry turned out to be very relevant within our own sample. Despite concentrating upon low technology industries like food, fishing, logging and forestry for about 25% of our sample, we were unable to isolate a significant number of truly low-tech firms in terms of their survey response. Either the firms that responded rejected the label "low technology" or they objectively varied appreciably from the norm in their industry.

In the case of forestry and pulp and paper mills, recent developments in the industry have stressed restructuring and retooling in terms of upgraded capital equipment and machinery and the latest technological innovations. It may therefore be inappropriate to regard this sector as low-tech.[13] In fact, if one considers the number of symbolic analysts employed as a proportion of the total number of employees by these firms, the results are quite surprising. For example, the food and fish product firms averaged about 75% of employees who possess skills that resemble those of symbolic analysts.

In examining this attribute in detail, one is able to distinguish these companies from clearly high-tech firms, for example, electronics firms. If one compares the mean of employee attributes for the food and fish product firms group with the micro-electronics group, it is clear that the employees in the latter group are required to possess in more depth and range symbolic analytical skills, for example computer literacy scores 8.5 in micro-electronics, under 7 in food and fish products, use of knowledge 9.5 in micro-electronics, 8.5 in the food group, and creativity 9 in micro-electronics, 8 in foods, strategic broker 8 in micro-electronics, 6 in the food group. The forestry, pulp and paper and resource firms group, on the other hand, appears to more closely resemble the electronics group. Even here, however, endurance, capacity to carry out orders, ability to do routine work, and ability to avoid boredom rank significantly higher and computer literacy, creativity and ability to design and strategize rank lower as befits a lower technology firm.

---

[13] See "Hewers of Wood are Returning to Favour", *Montreal Gazette*, March 24, 1997, p. C6.

The point is that although the food group and the forestry group value symbolic analytical skills they do not value them as highly as the microtechnology group. Does this make any difference with regard to attitudes toward bilingualism? We attempt to answer this question below. Both of these results, that is, rejecting the self description of "low technology" or objectively being high-tech in a low tech industry, are quite plausible according to Gera and Rose who emphasized the range of results within a given industry. The actual results are discussed in more detail below.

With few exceptions, the firms who responded to the study have export sales that are in excess of $50 million. There is thus little difference in terms of export sales, level of high technology dependence and reputation for innovation between those who responded and those who did not. This enhances the reliability of the sample data accurately reflecting within the appropriate confidence interval the population as a whole of these leading firms.

We first assembled a preliminary list of some 200 companies and then, using a regionally stratified sample technique, we selected 120 companies from this list. A total of 120 companies were thus contacted and 60 answered the survey in time for the analysis we have undertaken. Another three companies, numbers 61, 62, and 63 responded after this deadline. Because these companies are from the Atlantic region and the region is underrepresented in our sample we have included the results obtained from these companies as additional data in our report.

We contacted each company's human resources department by telephone and, after explaining the survey to them, we faxed them a copy and asked them to fill it and return it to us. In about half the cases we completed the survey at the time of the initial contact or at a pre-arranged later time. A typical interview lasted 20 to 25 minutes. This rate of response, over 50%, is judged to be quite adequate for a survey of this kind and permits statistical treatment of the data as if it were drawn from a normal population with the normal constraints of confidence intervals.

Another 1996 study of bilingualism in the private sector, by Victoria Communications, entitled The Use of Canada's Official Languages in the Private Sector, concentrated on firms in Ontario, Quebec and New Brunswick. It focused 80% on service sector firms and 20% on manufacturing. The study concluded that the following trends were present:

- bilingualism was seen as an economic asset in the era of globalization;
- language training and bilingualism were perceived as investments that produced benefits in terms of consumer satisfaction and market development;
- the demand for bilingual personnel is driven by increasing consumer demand for such services; and finally,
- there is a large unsatisfied demand for qualified bilingual personnel.

> *As companies are forced to adapt to changing working circumstances, they need people who are open to change. You need proactive change agents and people with different cultural experience and education are more likely to fulfill that role.*
>
> An Ontario company in the survey

The above study reaches conclusions that are largely supported by our own work.

COMPANIES IN THE SURVEY

The companies in our survey represent a wide range of actors in the Canadian economy and reflect a range of regional location and employment size. Because of the heavy representation of firms in the BOSS list from Ontario and Quebec, these same regions are heavily represented in the sample. The distribution of companies in the sample is as follows: Quebec, 15, Ontario, 30, British Columbia 8, Alberta, Saskatchewan and Manitoba, 6, and the Atlantic region, 1. (The results of another three firms from Atlantic Canada arrived late and are analysed separately.) In the case of the Atlantic region this is a clear underrepresentation in the list of 60 companies, despite our best efforts to elicit a better response rate. Since, however, none of our analysis focuses on the Atlantic region per se, it should not bias our results appreciably. If anything, the presence of a large Francophone population in New Brunswick would tend to mean that companies in the Atlantic region, particularly in New Brunswick and Nova Scotia, would value bilingual skills as do firms in Quebec. Once we include the additional three Atlantic companies, the Atlantic share rises to 4 or 6.3% of the total number of companies who responded to the survey, about the share of GDP that is accounted for by the Atlantic region. Two of these three additional Atlantic companies answered yes to question 2. One answered yes to all three questions.

> *Ability to master a second language shows skills in other areas: social skills, perseverance. It's a good sign.*
>
> An Ontario high technology company

Some of the firms are large employers with over 5,000 employees, while some are much smaller concerns with work forces numbering under 500. The total number of employees in Canada covered by the 63 firms in the survey respondents is 150,140. The number of employees worldwide covered by the survey is much greater. If we add the three late Atlantic surveys the number of employees in Canada rises by 6,150 to 156,290.

Fifteen of the companies could be regarded as traditional resource-based companies or food group companies, which, while au courant in terms of using high technology in their office management, I initially considered would not be at the cutting edge of technology or have a large number of symbolic analysts. Six of these are in the resources area. An additional two companies are located in the mining sector, which can be defined as medium or high technology depending upon the classification scheme.

Overall, the 63 companies break down as follows: micro-electronics, 15, transportation equipment and aeronautics, 13, other manufacturing, 13, foods, 11, pulp and paper and forestry, 6, mining, 2, machine tool, 1, banks, 1, pharmaceuticals, 1.

About 25% of the companies who answered the questionnaire are located in Quebec.This weight is slightly larger than Quebec's share in the economy overall. Thirty companies were located in Ontario and constitute 47.6% once we add the latecomers from the Atlantic region to the sample, a slightly larger portion than Ontario's share of the GDP. The Prairies, British Columbia and the Atlantic region are represented by 15 companies, or 25% of the companies in the sample (28.5% overall when the additional three companies are added) a slight underrepresentation of the relative share of these regions in the economy.

As we shall see in the following detailed analysis of the results, Quebec companies not surprisingly have a much stronger interest in employees who are fluent in both official languages. However, a strong interest in this attribute is by no means restricted to Quebec firms. It is also highly significant among firms that sell their product in the Quebec market and are major employers across the country. This significance, however, declines somewhat among high technology firms that are principally oriented toward exports in markets outside of Canada, are located outside of Quebec and who do not maintain a Quebec presence in either sales or distribution.

In the case of these companies, although there is acknowledgement that knowledge of Canada's two official languages is a positive asset among prospective employees, this trait is not as high on the list of desired traits as knowledge of computer skills or, in the case of certain West coast firms, knowledge of Asian languages like Mandarin or Japanese. Nevertheless, there are a significant number of firms located in Western Canada who value bilingual language skills very highly.

The number of responses permits us to undertake a statistical analysis in which for the population as a whole the normal curve can be taken as indicative of the underlying distribution. This permits the use of parametric statistics as well as non-parametric ones to analyse the data. The large nature of the sample relative to the population and the analysis of variance also permit us to have a high degree of confidence that the survey results will not differ from the population at the 95% confidence interval. Essentially, within a small margin of error the results will not differ 19 times out of 20 from those that one would obtain if one had statistics on the entire population.

> *Having French is always a plus and could swing a hiring decision in an applicant's favour—even in jobs where a second language is not needed.*
>
> An Ontario high technology company.

The first descriptive analysis of the data confirms the impression we received from our unscientific poll of last year. Ceteris paribus, possession of dual language skills is a positive attribute from the point of view of the human resource departments of the companies contacted. In a total of 53 cases out of 63 companies, that is 84.1% of the companies either recognized that knowledge of French and English was a positive asset or stated that they would give preference in hiring to prospective employees who possessed these skills. This result is an overwhelming endorsement of the view that possessing bilingual language skills represents greater job opportunities for those seeking work and thus is of clear economic value for the individuals involved.

Forty-three companies, or 68.2%, answered yes to question 2, is knowledge of French and English a positive asset? An additional 10 companies, while not initially answering positively to this question, answered question 2.2 positively and expressed a preference for an employee who was bilingual, other things being equal.

Seventeen of the 43 companies that answered yes as to the positive quality of bilingualism did not see a connection between this and symbolic analyst skills. (See Table 4.) Six companies answered yes to question 2.1 and question 2.2 but no to question 2. A further 17 companies answered yes to all three of these questions. Seven answered yes to Q.2 and no to the other two questions. This means that 19 of the 63 companies, 30.1%, believed that bilingualism was positive and that there was a linkage between it and the attributes of a symbolic analyst. A further 8 answered negatively to Q.2 but positively to Q.2.1. Thus a total of 27 companies, 42.8%, believed that bilingualism and symbolic analytical skills were linked. This result is not surprising to me because the question of linkage is fairly esoteric and likely to be misunderstood.

Nevertheless, it seems clear that 42.8% is a significant response that backs up the basic argument we are making in this paper. Of these 27 companies, 7 were located in Quebec, 12 were located in Ontario, 2 were located in the Atlantic region, 4 were located in British Columbia and 2 were located in the Prairies. Their mean score on computer literacy was 7.9 in comparison to the micro-electronics group, whose mean score was about 8.5.

Another language gives employees flexibility for job mobility around the globe.

An Atlantic province company.

The micro-electronics group numbered 15 companies, of which 4 answered yes to all three questions, 9 answered yes to Q.2, 11 answered yes to Q.2.2, and 7 answered yes to both to Q.2 and Q.2.2. Of the fifteen companies, four were from Quebec, nine were from Ontario, one from Manitoba and one from Alberta. The average yes responses per company was 1.6 for all companies and 1.45 for companies outside of Quebec.

The low technology food group consisted of 11 companies, 3 of which were from Quebec. Eight of the companies answered yes to Q.2 and ten answered yes to Q.2.2. Ten of the 11 answered yes to either Q.2 or Q.2.2. The average score on yeses was 2.18 for all companies and 2 for companies located outside of Quebec.

The low technology pulp and paper and resources group consisted of 6 companies, 2 of which were from Quebec and four of which were from British Columbia. Four of the companies answered yes to Q.2, 5 answered yes to Q.2.2 and 4 to both. The average number of yes

BEST COPY AVAILABLE

responses per company was 2.16 for all the companies and 1.75 for all companies outside of Quebec.

This lower score for the micro-electronics group than the low technology group on openness to bilingualism seems surprising and would appear to contradict somewhat the argument that I have been making in the paper. A possible explanation is the industry's idiosyncratic nature and its narrow focus.

The response of the remaining high technology groups was much more supportive of bilingualism. For example, 11 of the 13 companies in the transportation equipment group answered yes to Q.2 and 10 of the 13 answered yes to both Q.2 and Q.2.2. The average value of yes responses in this group was 2. Only one of the companies in this group was from Quebec.

The other manufacturing group consisted of 13 companies and is also considered high-tech. Four of the 13 companies were from Quebec, and the other 9 were from Ontario. Eight of the 13 companies answered yes to Q.2. Eleven of the 13 answered yes to either Q.2 or Q.2.2. The average number of yes responses for the group as a whole was 1.46, and for companies outside of Quebec 1.44.

The remaining high-tech companies were from the machine tool, banking, mining and pharmaceutical sector, 5 companies in all. Three of the 5 answered yes to Q.2 and 4 of the 5 answered yes to Q.2.2. The average number of yes responses for the companies, none of which were from Quebec, was 2.2. These results are summarized in Table 3.

Five of the companies who approved of bilingualism expressed no opinion as to question 2.1. This means that 36 companies or 57.1% saw no connection between bilingualism and these traits.

Of these 36 companies, 12 saw no virtue in bilingualism and furthermore saw no connection between being bilingual and the attributes of a symbolic analyst. Of these 12 companies, three of them were situated in the low technology group, five of them were located in Western Canada, including the two low technology companies; three of the four located in Ontario and Quebec were in the other manufacturing sector, a high-tech category in the Williamson study but medium and low-tech in the Gera study.

Table 3 Responses to Questions 2 and 2.2 by Industry Group

Group	Number of companies	Q.2 Is knowledge of both French & English considered a positive asset?	Q2.2 If two potential employees have similar profiles (education, experience and skills) would the fact one has a second language influence your decision?	Average per Company
		Number of Yes Responses		
Low-tech food	11	8	10	2.18
Low-tech forestry, pulp and paper	6	2	5	2.16 (1.75)
Micro-electronics	15	9	11	1.61 (1.45)
Transportation equipment	13	11	10	2 (2)
Other manufacturing	13	8	6	1.46 (1.44)
Mining, banking, pharmaceuticals and machine tools	5	3	4	2

Note: The number in brackets in column average yeses refers to the average for non-Quebec companies. If no number in brackets is present there were no Quebec companies in the group.

Table 4 Breakdown of Responses of Companies Favouring Bilingualism

Number of companies	Q.2 Is knowledge of both French & English considered a positive asset?	Q.2.1 Do you see a connection between the ability to act as a strategic broker, manipulate written information, data, blueprints, communication skills, creativity and imagination and the ability to speak another language?	Q2.2 If two potential employees have similar profiles (education, experience and skills) would the fact one has a second language influence your decision?
43	Yes	n/a	n/a
44	n/a	n/a	Yes
53*	Yes	or	Yes
17	Yes	Yes	Yes
2	Yes	Yes	No
17	Yes	No	Yes
7	Yes	No	No
4	No	No	Yes
8	No	No	No
2	No	Yes	No
6	No	Yes	Yes

Total Companies : 63
Note: A "no response" is recorded as a "no" in this table.
*: Answered yes to either question 2 or 2.2.

One of them was located in the Atlantic region and was engaged in coal mining, classified as either low or medium technology depending upon the classification scheme adopted. Thus the group could be regarded as a low or medium technology group, one third located in Western Canada and not disposed toward bilingualism.

Of the 53 companies that were positive about bilingualism, 14 were located in Quebec. Only one of the companies located in Quebec did not appreciate the value of bilingual employees. Another 22 of the companies were located in Ontario. Finally, of the 18 companies outside of Ontario or Quebec who responded to the survey, 14 of them indicated a preference for bilingual employees, other things being equal, or thought that being bilingual was a positive asset. This openness to bilingualism, 77.8%, is almost as positive as that in Ontario, where it is 83.3%, while it is 93.3% in Quebec.

> *Knowledge of a second language, other things being equal, would tip the scale in the candidate's favour.*
>
> The company with the largest number of employees in the survey.

In the case of these companies outside of Quebec and Ontario, bilingual referred to French and English. In the case of one company, a knowledge of Japanese or Chinese was preferred in addition to English. In several other companies in Ontario and Manitoba where no preference was expressed for bilingual employees, these same companies indicated that knowledge of other European languages like German or Spanish would be helpful.

In the case of the 17 companies who answered yes to all three questions, 7 of the companies were located in Quebec and 2 in the Atlantic region. Six companies were located in Ontario.Two companies were located in British Columbia and Saskatchewan. Outside of Quebec, of the 10 companies 3 were ranked as food, fishery, resource or pulp and paper companies. Overall 9 of the 17 companies were ranked in these groups. This is a considerably greater representation than their weight overall in the sample, about 25%.

In order to explore the nature of the forestry and foods groups in more detail, further investigation of their questionnaire results revealed that preference for bilingualism was concentrated in their management and professional divisions where knowledge workers were found in large numbers, or in their sales divisions where knowledge of a second language was considered an asset. Of the 17 companies in these categories, 5 expressed no preference for bilingual employees.

BEST COPY AVAILABLE

There is some degree of difference between low and high technology industries but it is not as striking as I expected, perhaps because the difference in terms of low and high technology in the specific firms who responded to the questionnaire is not as great as I had expected. Their responses on openness to bilingual employees and the value that they placed upon hiring people with bilingual skills revealed were greater than I expected.

LARGE EMPLOYERS

When one groups companies by numbers of employees, we discover that just 13 companies account for 77% of all the employees in the survey. The employees of these 13 companies number 120,200, for an average size of 9,246. The remaining 50 companies are much smaller and account for just 36,290 employees or 725.8 employees per firm on average. Among the large companies, only one is in the low-tech classification. The other 12 are all high-tech and include four electronics group firms, one bank, 3 transportation equipment companies, and 3 other manufacturing companies. Ten of the 13 companies answered yes to Q.2., 12 of the 13 answered yes to Q.2 or to Q.2.2. This suggests that larger companies are more open to bilingualism than smaller companies.

> *Two years ago we didn't want workers to think. Now we want to responsibilize them. Also we can no longer afford the management structure and need workers to take their own decisions and not have someone think for them.*
>
> A British Columbia resource company.

Four of these 13 companies were located in Quebec, almost the same representation as the overall sample. The 10 companies who answered positively to Q.2 represent 107,700 employees. When one adds the other 2 companies that answered yes to Q.2.2, the employment total rises to 113,100. In employment terms, then, bilingualism is an asset because of the positive attitude of these major employers. (See Table 5)

Table 5 Largest Companies in terms of Employment and their Response to Questions about Bilingualism

Number of Employees	Q.2 Knowledge of both French & English considered a positive asset	Q.2.1 Do you see a connection between the ability to act as a strategic broker, manipulate written information, data, blueprints, communication skills, creativity and imagination and the ability to speak another language?	Q.2.2 If two potential employees have similar profiles (education, experience and skills) would the fact one has a second language influence your decision?	Hiring projections over the next five years
45,000	Yes	Yes	Yes	m/v
30,000	Yes	m/v	Yes	m/v
8,600	Yes	Yes	Yes	150
7,100	No	No	No	40
5,000	Yes	m/v	m/v	0
4,000	Yes	Yes	Yes	200
3,500	Yes	Yes	Yes	800
3,500	Yes	Yes	Yes	m/v
3,000	No	No	Yes	m/v
2,800	Yes	m/v	m/v	15
2,800	Yes	No	Yes	m/v
2,500	No	Yes	Yes	50
2,500	Yes	Yes	Yes	500

Note: In this table m/v refers to a missing value, unanswered question or non-numerically answered question.

THE LOW TECHNOLOGY GROUP

A total of 17 companies could be classified as belonging to either the food and resources group or the pulp and paper group. Eleven of these belong to the food or resources group, while six belong to the pulp and paper and forestry group. If one compares the sum of employment by category for these two groups with those for the micro-electronics firms, certain surprising results show up.

The survey shows that 51.6% of all employees in the micro-electronics group are symbolic analysts. This compares with 59.9% for the forestry, pulp and paper and resource group and 61.6% for the food and fish product group. Thus these supposedly low-tech industries are represented by firms with an unusually high percentage of symbolic analysts. The comparable figure for all firms in the sample is 29.3%. Clearly these are not representative low-tech firms or, as we discovered when we looked at the questionnaires in detail, the numbers reflect their management divisions only.

On the whole, these groups are very open to bilingualism. This greater openness to bilingualism remains true when one eliminates the Quebec-based companies. For example, there are 11 companies from the food group. Four of these companies are from Quebec, two from Ontario, one from Saskatchewan, one from Alberta, one from British Columbia and two from the Atlantic region. Five of these companies answered yes to all three questions that asked about the positive nature of bilingualism or the connection between bilingualism and other symbolic analyst attributes. Once we take out the Quebec companies the number declines to two companies out of seven. None of the companies answered no to all three questions. In fact, five of the seven outside of Quebec answered yes to two of the three questions and all seven answered yes to at least one of the questions.

Clearly, this control group cannot be seen as a low-tech group despite coming from what is regarded as a low-tech industry because of the weight that is placed by the companies in the group on symbolic analysts. In this sense their positive response to bilingualism is not inconsistent with their human resource policy, despite their official designation as members of low-tech industries. As I explained above, the questionnaires reveal that symbolic analysts play a major role in their management and professional divisions.

In the case of the micro-electronics firms, clearly a high-tech industry, there were 15 companies in total, including four from Quebec, 9 from Ontario, one from Manitoba and one from Alberta. Overall only two companies answered yes to all three questions and one of these was in Quebec. Outside Quebec, only 1 in 11 companies answered yes to all three questions. Six of ten answered yes to two questions and eight answered yes to at least one question. The results in terms of average number of yes responses per company is 1.6 for the microelectronic group and 2 for the food group. If anything, the food group was slightly more open to bilingualism than the micro-electronics group.

Let us examine the results for the resource group of companies, i.e. pulp and paper and forestry companies. Overall this group was composed of six companies, of which 2 were from Quebec and four from British Columbia. Of the 4 non-Quebec companies, one answered yes to all three questions, one answered no to all three, one answered yes to two of the questions and three of the four answered yes to at least one question. The two Quebec firms answered yes to all three questions. The average number of yes responses per company outside of Quebec in this group was 1.75, and for the group as a whole, it was 2.16.

THE HIGH TECHNOLOGY COMPANIES OUTSIDE OF MICRO-ELECTRONICS

The remaining 31 companies come from groups that are classified as high technology by the Williamson study. These are chemicals, machine tool, transportation equipment, aeronautics, communications, other manufacturing, pharmaceuticals and biotechnology and banks. In addition, there are two mining companies. The results on answers to the questions about language are as follows.

Six of the 31 companies answered yes to all three questions, two answered no to all three and 24 answered yes to at least one question. If we exclude Quebec firms, the number answering yes to all three drops to five companies. Overall for these 31 companies from high technology industries the number of yes responses to the three questions measuring attitudes toward bilingualism the average per firm was 1.81.

SOME CONCLUSIONS

These results would seem to clearly indicate that as far as our leading export and innovative firms are concerned, being bilingual (French and English) is a definite asset when searching for a job. This confirms what we already know about lower unemployment rates among bilingual members of the labour force. At the same time, companies expressed a strong preference for employees who were computer literate, able to conceptualize and work with abstract data, work co-operatively yet independently, manipulate symbols, communicate effectively, act as a strategic broker, problem solve and design and strategize. All of these skills are precisely those identified by Robert Reich as those of the symbolic analyst.

Clearly, being bilingual is one of a number of employee attributes valued by prospective employers in this area of the economy. Symbolic analysts account for almost a third of all the employees in these companies.

Being bilingual is clearly an advantage. However, it must be accompanied by the skills associated with those of a symbolic analyst in order to maximize hiring potential. If we examine these firms we can see that the more traditional qualities like carrying out orders, ability to do routine work, ability to avoid boredom, and endurance are considerably lower-ranked. Hence our first sweep of the data appears to confirm our theoretical hunch about the role of bilingualism in the emerging character of the symbolic analyst. We should also point out that just as possessing computing literacy and symbolic analytical traits is important for maximizing opportunities, knowledge of French and English is desirable. The suggestion by some that unilingualism in each region is a good approach to the educational and economic advancement of our young people would not seem to be supported by the data in this study.

A LOOK AGAIN AT THE LOW TECHNOLOGY GROUP

In an effort to assess the differences between low and high technology, those firms in the food, resource and pulp and paper area were analysed separately from firms in the micro-electronics, biotechnology, pharmaceuticals, transportation and communications, aeronautics, machine tool and other manufacturing area. The thought was that these latter firms were clearly leading-edge, while the former might not be. The number of such latter companies in the sample was 15.

Contrary to our expectation the former firms had a higher proportion of their employees whom their firm considered possessing attributes comparable to those of symbolic analysts than did the other firms. The score in this category was over 75%. However, as was established above, the intensity of the preference for symbolic analytical skills is somewhat less than for the microelectronic industries.

The fact that these skills are valued by these firms could reflect a level of imprecision in the questionnaire design or the fact that food companies, resource companies and pulp and paper companies are in fact high and not low technology companies, despite the overall lower ranking of their industry group. As one respondent put it in answering our survey "every worker has to be responsible, highly skilled, his own boss, capable of taking independent decisions, managing complex equipment and managing his job, even those cutting the trees." Finally, as discussed above, a closer examination of the questionnaires for this group revealed that the respondents were usually referring to their management, professional or sales group when answering questions about the number of symbolic analysts and their human resources policies.

It is puzzling that the number of symbolic analysts is higher in this low-tech group. It is difficult to think of many firms these days except those in the retail services that do not use complex machinery and micro-electronics equipment. Other older more traditional firms have largely disappeared from the Canadian economy. Even in the retail trade there is a growing reliance on computerized equipment. We can simply say that the resource and pulp and paper companies we sampled do not seem to fit the conventional bill of low technology.

The proportion of employees who could be regarded as symbolic analysts except for the resource companies was highest in the micro-electronics category at 55%. The relative number of employees in this group, 25,470 or 17.9% of the total number of employees in the sample, is unfortunately small. In terms of their attitude toward bilingualism they were not as favourable as the other high technology groups.

SOME IN-DEPTH STATISTICAL ANALYSIS

It is clear from the above that bilingualism is a definite advantage in the contemporary Canadian economy in terms of securing interesting work with some of our most innovative firms. But how much of an advantage is it? What is the relationship between the attributes of a symbolic analyst and those of a bilingual individual and how does this interaction shed light on the issues we have posed in our introductory material and previous papers on this subject? In order to advance our knowledge further, I have treated some of the data set to some further statistical probing to help us understand more about the relationships.[14]

Areas to be explored include the correlation of variables like 2.1 "Is knowledge of French or English considered a positive asset" and scores for computer literacy or other symbolic analyst attributes. By doing this we will be able to assess the strength of the argument that the growing emphasis upon symbolic analyst roles in the workplace will help workers who possess bilingual skills. Or if the association is not strong it will tell us that more work needs to be done with employers to explain to them the advantages of such employees, possibly through a targeted educational and publicity programme.

One of the first such runs we performed was mean, standard deviation and correlation statistics: all firms employee attributes. Examination of the correlation coefficients revealed significant associations between the various symbolic analyst attributes. This is not surprising although comforting because it indicates that a number of these attributes tend be associated with one another in employer preferences. In essence Reich's argument about the nature of the symbolic analyst and the emergence of this kind of worker in the contemporary firm is supported by this data.

---

[14] There is a methodological issue here in terms of the kind of statistics we compute. Some "pur et dur" statisticians might object to certain parametric tests on the data on the grounds that it is illegitimate to use these statistics when the data is nominal, ordinal and in some cases ranked but not ratio data. However, many other analysts, particularly in the management field, dispute this claim and regularly use the parametric approach to analyse Likert scale data. See for example Bruce Barringer et al "Export Performance: The Role of Corporate Entrepreneurship and Export Planning," Journal of International Management, Vol. 2, No. 3, 177–199, 1996.

For example, there was a strong association between the value placed on the attribute ability to test hypotheses and computer literacy. There is a correlation value of .5698 and a p value of .000. There are also strong correlations between computer literacy and ability to manipulate symbols (.4561 p=.000), use one's imagination creatively, (.4422 p=.000) and design and strategize (.4600 p=.000). On the other hand, the associations are much weaker between computer literacy and ability to avoid boredom at work (.0969 p=.486) and endurance (.2537 p=.062). Both of these latter attributes are not associated with symbolic analysts while the previous four are.

When p=.000 this means that there is zero chance in 1000 probability or less than 0 chance in 1000 that a correlation of .5698 (the value for test hypotheses and computer literacy) could occur when there is no linear association between the two variables. Similarly in the preliminary report the attribute strategic broker was correlated with the ability to test hypotheses with a coefficient of .4443 and a p value of .008 (8 chances in 1000 that the result could be capricious. On the other hand, non-symbolic analyst attributes like the ability to follow and carry out orders is highly correlated with another non-symbolic trait, endurance, a correlation coefficient of .8289 and a p of .0005 in the preliminary report and .6109 with p=.000 in the current assessment. Clearly Reich's categories hold up well in this study.

It is useful to note that for the entire sample one of the highest variable mean scores was for the ability to work co-operatively while the lowest were shared by ability to do routine work and the ability to avoid boredom at work. The ability to solve problems, to communicate effectively, computer literacy and the ability to use knowledge scored high. Clearly, the more traditional qualities of endurance, ability to do routine work and ability to avoid being bored are being surpassed in our workplaces by new skills captured in Reich's notion of the symbolic analyst. But the ability to work co-operatively is still a very highly valued skill.

We undertook an in-depth examination of those firms that were most disposed toward bilingualism. These were firms who answered yes to all three questions: 2, 2.1 and 2.2. If we compare these results to those for the population as a whole we ought to be able to learn something about the nature of these firms.

In the case of the 17 companies who answered yes to all three questions as we established above, 7 of the companies were located in Quebec and 2 in the Atlantic region. Six companies were located in Ontario. Two companies were located in British Columbia and Saskatchewan. Outside of Quebec, of the 10 companies, 3 were ranked as food, fishery, resource or pulp and paper companies. Overall 9 of the 17 companies were ranked in these groups. This is a considerably greater representation than their weight overall in the sample, about 25%. Of the 7 companies in Quebec, all but one of them were from the forestry or food group. The one company was an electronics company. Four of the 10 outside Quebec were in the forestry or food group. Four were in the transportation equipment group, 1 was other manufacturing, 1 was electrical. When one compares the means on the scores of preferred skills with the companies that answered no to all 3 questions, some interesting differences show up. However, they do not conform to any expected pattern and may simply reflect the influence of regional location. These results are reproduced in the following table.

Table 6 Comparison of Mean Scores on Attributes for Companies Answering Yes to all 3 Questions on Bilingualism to those Answering No

Variable	Companies Answering Yes Mean	Companies Answering No Mean
Endurance	6.27	6.86
Avoid boredom at work	6.73	5.57
Ability to follow and carry out orders	6.77	8.43
Execute others' ideas	6.79	8.57
Test out hypotheses	7.86	8.57
Computer literacy	7.79	8.86
Communications skills	9.14	8.50
Ability to solve problems	9.00	9.57
Work cooperatively and independently	9.14	9.57
Ability to manipulate symbols	9.14	9.71

Note: Companies which answered yes, answered yes to questions 2, 2.1 & 2.2.
Companies which answered no, answered no to the same questions.

Contrary to what we expected in a number of categories, these six companies who were not open to bilingualism scored higher on a number of symbolic analyst attributes. Only on ability to follow orders did they score higher in such a way as the analysis might have predicted. However, when we examine the companies, 1 comes from Quebec, 1 from Ontario, 1 from Manitoba, 1 from Saskatchewan, 1 from British Columbia and 1 from Nova Scotia. For the pro-bilingual companies, Western Canada representation is limited to 2 of the 17 companies, and Atlantic Canada representation is limited to 2 of the 17. So possibly it is regional location rather than attitudes to symbolic analysts that is a better predictor of attitudes to bilingualism. In any case, we cannot prove any case from the available data.

The rankings of symbolic analyst skills were similar, although far from identical in both groups, with manipulating symbols, working co-operatively, ability to solve problems, communication skills and computer literacy and hypothesis testing ranked 1 to 6 for the no to bilingualism group; while the ranking 1–6 for the positive group was working co-operatively, ability to problem solve, and ability to use knowledge, communication skill, creative imagination, ability to manipulate symbols. The bottom three for the no group were boredom at work, ability to do routine work and endurance, while the bottom three for the yes group were endurance, boredom at work and ability to follow orders. Following orders and executing ideas ranked in the middle of the no group but in the bottom 4 in the yes group. So some further credence was given to our argument by the rank orderings but no overwhelming evidence.

CONCLUSION

This survey as far as I am aware represents one of the largest surveys of its kind to test the economic impact of bilingualism and, in particular, the relationship between bilingualism and access to employment. It offers overwhelming evidence that bilingualism increases your chances of getting employment. The world of work has changed dramatically in the past decade and maximum flexibility and range of skills are necessary parts of any job seeker's portfolio. We have shown that being bilingual greatly increases your chances of being viewed in a preferred way by companies looking for new employees. In simple terms it increases your chances of getting a job.

There are regional differences in this but not as great as one might have thought. Of course, one must not only be bilingual but possess other symbolic analyst skills as well. However, most of the 63 companies who responded made it clear that they considered bilingual candidates positively and, other things being equal, would prefer a bilingual candidate over a unilingual one. There is no doubt that bilingualism makes a very positive contribution to our economy and to our ongoing effort to produce a well-trained, flexible and productive work force in these very challenging times.

This report has also elaborated a complex model of how bilingualism and the role of the symbolic analyst may be intertwined. Less than half of the companies who responded agreed with the claim, although over 40% did. It would seem that further work is needed to educate companies about the connection between these language skills and the desirable traits that they search for in employees. The fact that a significant number of companies recognize the connection means there is fertile ground for further education in this area. Companies value bilingualism, many understand why in terms that match the model I have developed in the report but many others who also value it do not fully appreciate the connection.

In any case, Canadians have opted for a model of linguistic duality that is well suited for our voyage into the twenty-first century. If we continue to progress on this approach, the dividends that will flow from it will be great. To maximize these benefits we need to leave no stone unturned in creating the right climate that is supportive of job creation and employment growth which is rooted in the appropriate monetary and fiscal policy choices. With such a base, our rich heritage in two of the great languages of the world and in the tapestry of cultures that is Canada will serve us well in the future.

ACKNOWLEDGEMENTS

I would like to acknowledge the research and survey assistance of Ms. Susannah Benady and the indispensable computer assistance and aid with programme management of Mr. Joel Segal. I would also like to thank Ms. Gisela Frias, Ms. Danielle Lustgarten and M. Martin Lampron for research help. Mr. Michael O'Keefe of the Department of Canadian Heritage and several other officials of the Government of Canada were very helpful in responding to questions and suggesting information sources. I would also like to thank Mr. James Day. A project of this scope would have been impossible without the aid of all of the above individuals. I alone, of course, accept the usual responsibilities of authorship for any errors that may remain.

6. THE CONTRIBUTION OF A MINORITY TO ITS REGION: THE ACADIANS OF SOUTHEAST NEW BRUNSWICK

Maurice Beaudin
Canadian Institute for Research on Regional Development
Université de Moncton

INTRODUCTION

Southeast New Brunswick has been experiencing remarkable economic vitality for some years. Some quarters viewed this as a real success story. Media outlets across Canada, such as La Presse (November 15, 1991), *The Globe and Mail Report on Business* magazine (August 1992), *Les Affaires* magazine (Special Report of March 30, 1996), *Le Devoir* (June 1992) and *Atlantic Progress* magazine (November 1995) have described the region's economic renewal in such terms, as each interpreted this astonishing adjustment in its own way. Like the media, the Canadian Federation of Independent Business (CFIB) stressed the special contribution of the Acadians who, CFIB said, have built a respectable entrepreneurial foundation.[1]

When we consider the serious setbacks of the late 1980s resulting from closure of the Canadian National shops (one of the economic pillars of the Moncton area), the loss of the Canadian Forces Base, and the abandonment of a number of large and long-established businesses in the region, the economic vitality now being aknowledged is indeed surprising. At first, the region does not seem to be blessed with significant strategic assets capable of triggering and maintaining this revitalization. Southeast New Brunswick is located away from the centres of North American development in a region (the Maritimes) which is itself marginalized in the Canadian context, and must also live with an economic base that is largely governed by seasonal cycles. In addition, the region's linguistic division results in the costs and problems inherent to the presence of language groups. Paradoxically, this latter specificity seems to be a major factor in this renewed dynamism. Although it is hard to identify the players responsible for the region's current economic vitality because of its complexity, there is a degree of unanimity: the Acadians have made a full contribution, both in terms of their involvement in economic agencies and of their entrepreneurship. The linguistic division hitherto regarded as a drawback has transformed the region into a bilingual one that is the key ingredient of this economic rebirth.

---

[1] According to P. Thompson, *Small Business and Job Creation in New Brunswick–1993*, Canadian Federation of Independent Business, July 1996.

The Southeast region is special in another way. It reflects the characteristics of New Brunswick, a province itself regarded as a microcosm of Canada. With a population of 700,000, including 250,000 Francophones (35% of the total), New Brunswick is the only Canadian province to officially recognize the two founding languages, English and French. The Southeast is home to a large Francophone minority (46% of the total), nearly half of which live within the metropolitan Moncton[2], where they make up one third of the population. In addition, Moncton hosts the Université de Moncton campus (5,000 students and more than 20 research centres in a variety of fields). This is the only true Francophone University outside

---

[2] The Moncton metropolitan will be referred to as "Greater Moncton" throughout this paper. It consists of the urban core (population 84,000) consisting of the City of Moncton and the Cities of Riverview and Dieppe, as well as a surrounding suburban belt with a population exceeding 20,000.

Quebec. The Groupe financier Assomption[3] and the New Brunswick Economic Council, a body that represents the interests of more than a thousand Francophone businesses, also have their headquarters in Moncton.

Several questions come to mind on the basis of these statements. How did the Acadian minority, which survived for more than two centuries in isolation and in the face of the indifference of the English majority, did not have an appropriate educational structure and was practically excluded from the administrative, political and economic establishment, manage to participate in this economic renewal which now appears as a model of adjustment? What factors and circumstances enabled this minority, in addition to becoming part of the regional economy, to make a real contribution in this regard? What is the basis of this vitality and can similar scenarios be envisaged elsewhere? To answer these questions, two goals have been set. First, we will seek to demystify Acadian entrepreneurship: its roots, profile, role in the current economic adjustment process, and its support and development network. Consideration of the role of the Université de Moncton as a catalyst requires us to consider this subject. We will then seek to show how this Francophone minority is contributing to the socio-economic prosperity of the entire region.

METHODOLOGY/DATA SOURCES

Many studies of regional economies and the sociology and economics of minority groups have been conducted in Canada and elsewhere. The Maritime Acadians have not been ignored, since they have been the subject of a substantial amount of work and investigation, specifically in the context of the economic development agreements of the 1960s, 1970s and 1980s. However, most of these studies adopt a strictly regional or sectoral framework and ignore linguistic attributes and their economic advantages.[4]

---

[3] An institution that probably reflects the Acadians' emergence into the modern era more than any other. This mutual life insurance company, founded in 1903 by Massachusetts Acadians, decided shortly thereafter to establish its headquarters in Moncton. In the early 1970s, a period of conflict and mutual lack of understanding on the part of the two linguistic communities, the Groupe Assomption advertised its success by building a downtown 20-storey building (the most pretentious in the city), thereby stimulating the pride of the Acadian community, which had hitherto looked inwards. The institution remains a major regional financial undertaking and until recently its headquarters (Place l'Assomption) accommodated the Moncton City Council and several City departments.

Thus, since we cannot rely on comprehensive studies of the topic, our analysis is based mainly on statistical data collected by formal establishments and recorded specially for our work. Our task consists, first, of preparing a profile of the Acadian entrepreneurial fabric that is as detailed as possible and is also comparative in nature: locating and listing the entrepreneurs and their areas of activity, estimating their impact on employment, evaluating their export capacity, etc. At the same time, we focus on a number of themes related to or underlying the entrepreneurial environment: the impact of institutions and policies, the social environment, urbanization of the economy and business development. Although this exercise is essentially based on numerical data, it will lead us to the foundations of Acadian entrepreneurship in southeastern New Brunswick, thus enabling us to gauge the extent of its participation in the regional vitality referred to above.

Three sources are relevant for our analysis. First, we can rely on the lists of businesses provided by the region's three economic development commissions and, second, on the New Brunswick directory of products and manufacturers. These data, combined with the more general census data, form the quantitative basis of our research project. However, the lists of businesses do not reflect the linguistic status of firms. With the help of contacts, including the New Brunswick Economic Council and local development agencies, we were able to identify a large number of Acadian businesses. For the rest, we were simply guided by the name(s) of the business owner(s).[5] Despite these few unavoidable shortcomings in data collection, we were able to collect information from 5,752 companies in the Southeast region, including data on their location, size (number of employees) and their economic sector. Although the provincial directory of products and manufacturers is limited to the manufacturing sector, it provides a variety of information of the same kind, and also information on types of products and exports. The geographical area in this study is commonly known as "the Southeast", i.e. the area within the boundaries of the three regional economic commissions (see Map 1). This definition is more limited than Statistics Canada's, which includes all of Kent, Westmorland and Albert Counties in the New Brunswick Southeast Economic Region. As thus defined, our territory has a population of approximately 160,000, compared with 172,000 for the Southeast Economic Region. We also divide the region into two separate areas: the urban area centred on Moncton, served by the Greater Moncton Economic Commission (GMEC); and the other, mainly rural area within the boundaries of the Kent Economic Commission Inc. (KEC) and the South East Economic Commission (SEEC), which together cover the territory of Kent-Shediac. This coverage facilitates comparative analyses on a linguistic basis and also helps to highlight the major trends of rural and urban entrepreneurship. In fact, we will see that location is a key factor in the entrepreneurial environment and, consequently, in economic vitality.

---

[4] Specifically concerning the Acadians, we refer to a major 900-page thematic study, *L'Acadie des Maritimes : études thématiques des débuts à nos jours*, published in 1993 and edited by the historian Jean Daigle of the Université de Moncton Chair of Acadian Studies. It would seem, however, that the development issue has seldom been approached from the angle of a minority's contribution to its region. However, a recent (1995) study by the Canadian Institute for Research on Regional Development (Beaudin *et al.*) for Canadian Heritage addressed this issue with respect to the Acadian minority in Prince County, Prince Edward Island, and the Anglophone minority in the Gaspé. Although exploratory in nature, the analysis highlighted the factors explaining the situations of vitality or dependence common to these minorities.

OVERVIEW OF STUDY REGION

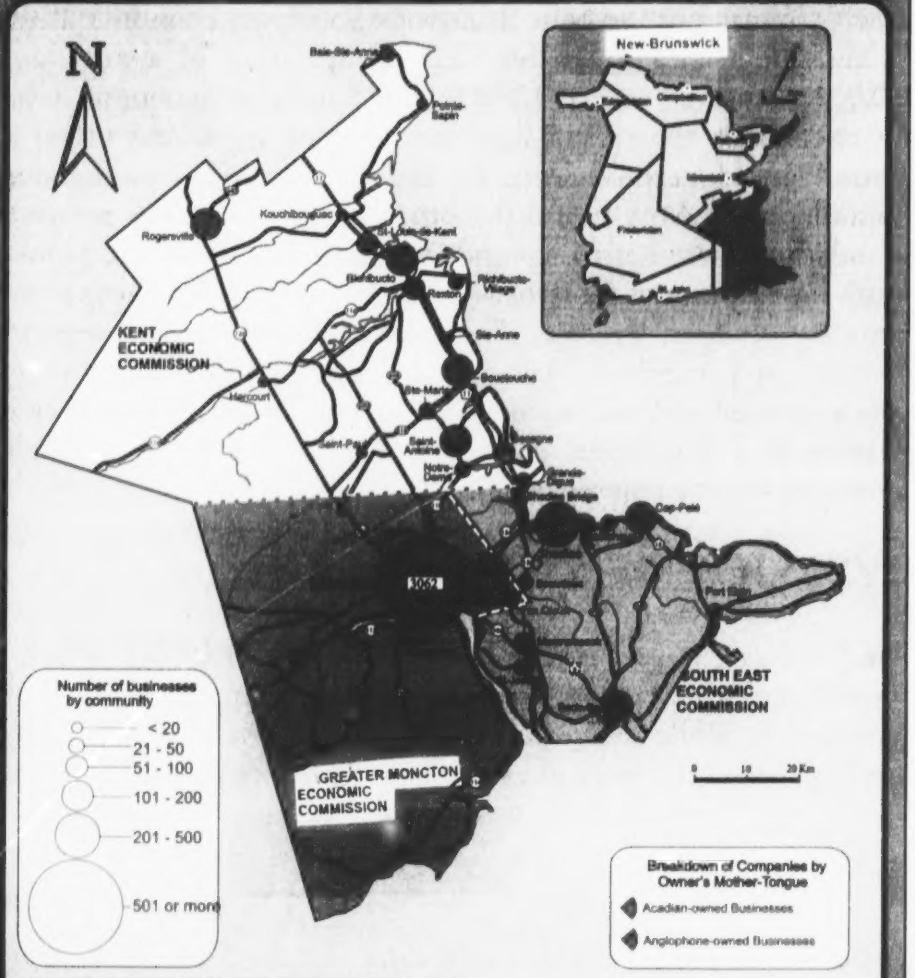
The Southeast is part of a fringe region, the Maritimes, which has become increasingly marginalized in Canada over a period of several generations. While the region has maintained its standard of living, this has been at the price of excessive dependence on federal transfers

---

[5] The name(s) of the business owner(s) enabled us to record the region's businesses on the basis of language. This method is clearly without a scientific basis but relies on common sense. It would otherwise be practically impossible to identify the linguistic status of companies. In a linguistically mixed region, where the minority element has a strong tendency to represent itself in the majority language, it is even less practical to rely on the firm's name, since most of them are English. Thus, the owner's name is the only alternative that allows us to establish the profile of Acadian businesses.

(Savoie, 1992). There are a total of about 300,000 Francophones in the Maritimes as a whole, making up 16.5% of the population. However, they are largely concentrated in New Brunswick, where they represent 33% of the provincial population. Their relative concentration in the northwest/southeast band gives them substantial demographic and political weight in the province. The Southeast region as defined in this report has a population of approximately 160,000, of which 73,000

Map #1
Southeast New-Brunswick
Distribution of Business by Linguistic Status, 1995


N
New-Brunswick
Baie-Ste-Anne
Pointe-Sapin
Kouchibouguac
Rogersville
St-Louis-de-Kent
Richibucto
Richibucto-Village
Rexton
Ste-Anne
KENT ECONOMIC COMMISSION
Bouctouche
Harcourt
Ste-Marie
Saint-Paul
Saint-Antoine
Cocagne
Notre-Dame
Grande-Digue
Shediac Bridge
Cap-Pelé
Port Elgin
3062
SOUTH EAST ECONOMIC COMMISSION
0
10
20 Km
GREATER MONCTON ECONOMIC COMMISSION
Number of businesses by community
< 20
21 - 50
51 - 100
101 - 200
201 - 500
501 or more
Breakdown of Companies by Owner's Mother-Tongue
Acadian-owned Businesses
Anglophone-owned Businesses

Source: Greater Moncton, Kent and South East Economic Commissions Inc.
Produced by: Marc Cormier '96 Adapted by: Author

BEST COPY AVAILABLE

(46%) speak French as their mother tongue. The region includes metropolitan Moncton, which, with its 150,000 residents (including the surrounding suburban belt) is a regional distribution and retail centre for much of the Maritime provinces. Francophones make up 33% of the area's population, the same as for the province as a whole, although they constitute a majority (69%) in the Kent-Shediac region.

Table 1 Regional Linguistic Demography, 1981–1991

	1981			1991		
Geographical Units	Total Population	Linguistic Base		Total Population	Linguistic Base[1]	
		Anglo.	Franco.		Anglo.	Franco.
Greater Moncton	97,170	65,955	31,215	105,135	70,032	35,103
Kent-Shediac	54,330	17,065	37,265	54,696	16,747	37,949
Southeast	15,500	83,020	68,480	159,831	86,779	73,052
	Absolute growth 1981–91			Relative growth 1981–91		
Greater Moncton	7,965	4,077	3,888	8.2	6.2	12.5
Kent-Shediac	366	-318	684	0.7	-1.9	1.8
Southeast	8,331	3,759	4,572	5.5	4.5	6.7

1. The population has been adjusted for the number of mixed responses (Anglophone and Francophone) which totalled 4,350 for the entire southeast in the 1991 Census, or 2.7% of the total population. These mixed responses have been equally apportioned to the two linguistic groups.

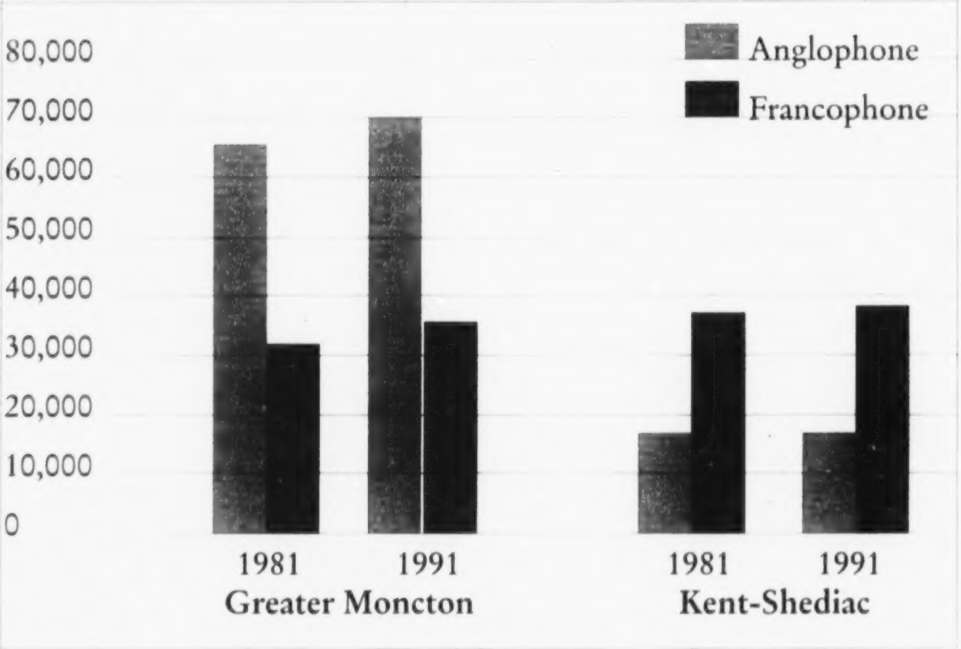
Source: Statistics Canada, 1981 and 1991 Censuses, Small Administrative Units Division; by author.

Francophone demographic vitality, sustained in part by immigration from their neighbours in the province's northern counties,[6] gives the community a growing demographic weight in the two study sectors. Francophones have increased their relative weight in the metropolitan Moncton, where they grew at twice the rate of Anglophones over the 1981–1991 period. The Francophone population grew only slightly in the Kent-Shediac sector, while the Anglophone population declined by almost 2%. Thus, because of the Francophone element, Southeast New Brunswick is maintaining and even adding to its demographic weight in the Maritimes as a whole.

---

[6] While Southeast New Brunswick has posted a net positive balance with respect to migration in recent years, this is mainly the result of an influx from northern New Brunswick. The migration balance between the Southeast and the North posted gains of more than 5,000 between 1976 and 1994. Based on *L'État des régions : la région économique du sud-est du Nouveau-Brunswick*, edited by M. Beaudin, *Collection Maritimes*, Canadian Institute for Research on Regional Development, Moncton, 1996, pp. 34–35.

Figure 1 Distribution of the Two Southeast Linguistic Groups (by Area, 1991 and 1981)



While southeast New Brunswick's economy is similar to that of the Maritimes, it is slightly less dependent on the public sector and based more on commercial and manufacturing activities. In fact, Moncton has become the hub of the retail trade and a distribution centre for the Maritimes. Although this is not a new situation (the CN maintenance and repair shops employed 5,000 people during the 1970s, and Moncton was also a recognized distribution and retail centre), the players and the entrepreneurial fabric have changed. The manufacturing and commercial sectors have expanded and diversified substantially.

The three Moncton area industrial parks are home to a wide variety of businesses, including a growing number in traditional areas, but increasingly in the leading-edge sectors of design/manufacturing (engineering, optics, instrumentation, informatics, software), distribution and specialized services. Furthermore, Moncton has experienced a new vitality since the early 1990s with the successive arrivals of several large outside firms in teleservice (call centres), distribution, data processing (forecasting) and research. More than 20 outside firms, including several with international operations, have either developed in the area, relocated their head offices or simply opened a new branch (e.g.: Purolator Courrier, Federal Express, Interlink Freight Systems, United Parcel Services Canada, Camco GE Canada, Royal Bank, Blue Cross, Canadian Pacific Hotels, Sun Life, Dun and Bradstreet, Clinidata). In less than a decade, more than 20 outside firms have set up in Moncton and generated more than 5,000 direct jobs.

The synergy of telecommunications services—New Brunswick was the first province to establish a full optical fibre network following an NB Tel initiative supported by private investors and the provincial government—and the region's traditional role as a distribution centre, have promoted the emergence and arrival of firms in this sector as well as other more traditional firms. As a result, the entrepreneurial landscape has changed dramatically within a decade. It should be noted, however, that regional entrepreneurship already existed before those firms arrived. Francophone firms were expanding throughout the 1980s in a great variety of sectors: food services, manufacturing, retail, transportation, finance (insurance, brokerage), consulting services, education and training, language technology, informatics, publishing and even biotechnology (industrial and urban processing). Francophones have also long been active in the co-operative sector and construction.

In the outskirts, within the Kent-Shediac area, the vitality is naturally different and is basically organized around small and medium-sized enterprises, although there are several large firms, primarily in sea product processing. The regional economy is mainly resource-based, particularly agri-food (fish, crops and farming) and manufacturing (furniture, boatbuilding, metal machining, wood processing, prefabricated homes). The fish processors operating in the Southeast are well established and highly competitive on international markets. The drying-salting-smoking sector (herring and other deep-sea products) is a traditional part of the regional scene, as is lobster processing. The southeast was one of the first Maritime regions to develop lobster canning in the 1880s. Exporters are currently seeking to diversify and break their excessive dependency on the U.S. market by offering a variety of high quality products, such as homard nouveau shipped to Europe by chartered flights.

Two other traditional sectors, construction and tourism, are important to the Kent-Shediac region. In addition to offering two national parks (Fundy and Kouchibougouac) in the area, the Southeast is a transit centre for Prince Edward Island and Nova Scotia tourism regions. Shediac (a centre with a population of 5,000) benefits greatly from this, as evidenced by the summer popularity of Parlee Beach (almost a million admissions in 1996). We can therefore say that the region capitalizes to some extent on the advantages of its location and the presence of significant natural resources (fish and seafood; lumber). It also benefits from its proximity to the regional centre of Moncton which provides job prospects and business opportunities. On the other hand, however, the region is dependent on this regional centre and finds it difficult to maintain its internal market level for goods and services. All in all, the balance is positive. The real problem relates more to the period of employment; more than one third of the labour force in the Kent-Shediac area is employed on a seasonal basis. This impacts on incomes and therefore on dependency on transfers. However, this problem is not unique to the region and is fairly similar to what can be observed in Canada's other semi-rural areas.

ACADIAN ENTREPRENEURSHIP IN THE SOUTHEAST: DIVERSIFYING AND CATCHING UP

As we have just seen, the economic basis of Southeast New Brunswick has changed since the mid-1980s, resulting in a more balanced entrepreneurial fabric. Obviously, this progress was achieved as a result of the Moncton area's vitality. This urban centre hosts 64% of the approximately 5,750 companies in the study region. It is interesting to note that 45% of the Acadian firms in the Southeast are located there, thus making up 35.5% of the local entrepreneurial fabric

Table 2 Location of Businesses by Linguistic Status–1995

	Geographical Distribution of Business					Regional Distribution	
	Number of Companies			% Share		Anglo. Businesses	Franco. Businesses
	Total	Anglo.	Franco.	Anglo.	Franco.		
Moncton	3,062	2,023	1,039	66.1	33.9	53.2	35.8
Dieppe	343	137	206	39.9	60.1	6.0	7.1
Riverview	235	193	42	82.1	17.9	4.1	1.4
Other localities	24	11	13	45.8	54.2	0.4	0.4
Greater Moncton	**3,664**	**2,364**	**1,300**	**64.5**	**35.5**	**63.7**	**44.8**
Shediac	263	45	218	17.1	82.9	4.6	7.5
Sackville	199	175	24	87.9	12.1	3.5	0.8
Bouctouche	191	7	184	3.7	96.3	3.3	6.3
Richibouctou	159	13	146	8.2	91.8	2.8	5,0
Cap-Pelé	140	9	131	6.4	93.6	2.4	4.5
Rogersville	112	4	108	3.6	96.4	2.0	3.7
Other localities	1,024	236	788	23.0	77.0	17.8	27.2
Kent-Shediac	**2,088**	**489**	**1,599**	**23.4**	**76.6**	**36.3**	**55.2**
Total southeast	**5,752**	**2,853**	**2,899**	**49.6**	**50.4**	**100.0**	**100.0**

Source: GMEC, KEC and SEEC, Compilation by CIRRD.

or slightly more than their demographic weight of 33.4% (see Map 1). These data confirm the attraction of the regional centre for the Acadian population and especially the business community. With the exception of Sackville, the medium-sized centres in the Southeast region are mainly Francophone. It is therefore logical to find a very high proportion businesses owned by Acadians, who in fact own 76.6% of companies in the Kent-Shediac area, a proportion well above their demographic weight of 69%. Thus, in the Southeast as a whole, Francophones are proportionally more involved in business than their Anglophone fellow citizens.

What is the foundation for the entrepreneurial vitality observed among this minority group? The answer is clearly not a simple one and probably includes social and psychological factors. This inclination for business noted among Francophones may be partly explained by the catching up they have had to do to respond to internal demand for goods and services which used to be generally supplied by Anglophone business. This would explain the relatively small size of Francophone businesses and their concentration in personal and professional services (see Table 3). As a result of their larger average size, Anglophone business companies hold larger market shares and employ more personnel, thus reducing the motivation (or need) to start businesses in this community.

However, this does not indicate slackness on the part of the Anglophone majority, who continues to dominate the key segments of regional economic activity. According to our analyses, in the Greater Moncton area, small businesses (fewer than five employees) make up 60% of the Acadian entrepreneurial fabric, compared with 51% among Anglophones; 46% of Anglophone businesses fall into the category of 5 to 50 employees, whereas only 38% of Acadian firms are in this category. These data provide some indication of catching up by Acadian entrepreneurs. This seems to be confirmed by the proliferation of business services and personal and professional services among the Francophone community. But while Acadian entrepreneurship was initially stimulated by internal demand, it has quickly spread into a great variety of areas and specifically exporting, as we will see later.

Table 3 Distribution (%) of Businesses by Size, 1995

	Greater Moncton Area		Kent-Shediac Area	
Size	Anglo.	Franco.	Anglo.	Franco.
1-4 employees	50.9	59.6	62.5	59.4
5-9 employees	25.6	20.4	16.5	20.2
10-19 employees	12.1	11.4	8.2	11.0
20-49 employees	7.9	6.0	8.2	5.7
50 or more empl.	3.5	2.6	5.6	3.7
Total	100.0	100.0	100.0	100.0

Source: KEC, SEEC, GMEC, Compilation by CIRRD.

This strong propensity to entrepreneurship among Acadians is therefore not explicable simply in terms of their involvement in the resource sector, as often suggested. We have just seen that this behaviour is equally visible in the Moncton area where the economy is basically service oriented. The Moncton area has a high proportion of university graduates and a substantial proportion of its labour force is functionally bilingual, which gives it certain comparative advantages in terms of businesses establishing their regional headquarters in such areas as commerce and customer service. Francophones are therefore using their education to enter the job market, which does not prevent them from also entering business.

They are strongly represented in traditional services[7] (44% in the Moncton area and 50% in the outskirts), but this attraction to associated services is equally observable among Anglophone entrepreneurs (Table 4). Also, this emphasis on traditional services tends to decline with the size of the city, which is confirmed by our data. Retail trade represents the largest sector in this category, both in Moncton and in the semi-rural area. As we indicated earlier, Moncton's economy is largely based on retail trade, which generates a high proportion of direct and induced jobs. It is also the largest industry (along with wholesale trade) in all of the Southeast, accounting for more than 20% of direct jobs. In the Maritimes and in Canada, the trade sector accounts for no more than 17% of the labour force. We also note a stronger representation of Francophone entrepreneurs in personal and miscellaneous services (15.2% of businesses compared with 10.7% for Anglophones), which tends to confirm our previous hypotheses concerning the catching up of Moncton's Francophone community in relation to these types of services. The linguistic ratio in this field is more balanced in the region, specifically because of the Acadians' dominant demographic weight.

---

[7] Economic activity is generally classified under two groups: the commodity sector and the service sector. Primary activities (such as agriculture, fishing, forestry and mining), manufacturing and construction make up the first group. The service sector is subdivided into three components: dynamic services (transportation and warehousing, communications, wholesale trade, finance and insurance, real estate and business services), traditional services (retail trade, accommodation and food services and other service industries), and also nonmarket services (government, education and health care/social services). Based on Economic Council of Canada, *Good Jobs Bad Jobs: Employment in the Service Economy: A Statement*, Ottawa, 1990.

Table 4 Sectoral Distribution of Businesses by Linguistic Status, 1995

	Greater Moncton		Kent-Shediac	
	Anglophone	Francophone	Anglophone	Francophone
Primary Activities	1.7	1.4	1.6	3.6
Manufacturing Sector	2.9	3.1	11.3	12.5
Construction	8.3	10.5	9.0	14.7
Commodity Sector	**12.9**	**15.0**	**21.9**	**30.8**
Transportation/ Warehousing	4.0	2.8	3.1	3.3
Wholesale Trade	14.0	9.6	3.5	3.1
Financial Services	2.0	2.0	1.2	2.2
Real Estate	5.4	3.5	1.2	2.2
Business Services	8.2	9.8	4.9	3.1
Dynamic Services	**33.6**	**27.7**	**13.9**	**13.9**
Retail Trade	26.2	24.0	27.5	26.5
Accommodation/ Food Services	4.5	4.8	13.5	9.5
Other Traditional Services	10.7	15.2	15.2	14.3
Traditional Services	**41.4**	**44**	**56.2**	**50.3**
Educational Services	2.2	1.4	0.6	0.4
Health Care and Social Services	9.9	11.4	5.1	4.2
Nonmarket Services[1]	**12.2**	**13.3**	**5.9**	**5.1**
All Sectors	100.0	100.0	100.0	100.0

[1] Also includes companies that provide government services.

Source: Compilation by CIRRD based on business directories provided by the Kent (KEC), South East (SEEC) and Greater Moncton (GMEC) Economic Commissions.

Dynamic services is a sector strongly representative of the economic structure. These services are usually a function of the size of the urban fabric, which accounts for their stronger representation in Moncton than in the Kent-Shediac area. This trend of dynamic or "driving force" industries to locate in urban environments is explained by access to information, available direct personal contacts, the very close industry (inter-business) links this type of activity requires, and also access to a skilled labour pool. In all such industries, intermediate demand—the proportion of production sold to other industries as intermediate inputs—is larger than final demand by consumers. In this context, Acadian representation in the urban environment is not only profitable but constitutes an undeniable strategic factor for the evolution of the Acadian economic space.

This being said, it is a sector in which the language gap markedly favours Anglophone entrepreneurship. This is more so in transportation and warehousing and also in wholesale trade. Given the late emergence of Francophone entrepreneurs we can, however, assume that they are integrating relatively well into these services. They have succeeded in edging out Anglophones in business services (9.8% compared with 8.2%). Those sectors remain generally dominated by Anglophone entrepreneurs with long-established substantial businesses. However, this does not exclude Francophone representation in such new areas as financial services (i.e. investment, insurance), real estate, communications and wholesale trade. But these are individual breakthroughs mainly by small units. Much remains to be done if equitable representation of Acadian entrepreneurs is to be achieved in these sectors.

Nonmarket services, another sector where there is a difference, seem to have a definite attraction for Francophone entrepreneurs in Moncton's urban economy. More than 13% of them are found in this sector (which has 12.2% of Anglophone businesses), including in educational and health services (professional firms) as well as in community, social and legal services. It should be noted that more and more women are active in these sectors. Finally, we should point out that there are proportionally three times as many firms in nonmarket services operating in the Moncton economy as in the Kent-Shediac area.

A final grouping of Greater Moncton Acadian businesses (15% of the total) operates in the commodity sector. The division between Anglophones and Francophones is not so obvious in this field in the metropolitan Moncton area. However, in rural areas, we observe a marked preference by Francophones for primary activities, processing and construction (Table 4). This being said, we have seen a number of firms emerge over a period of years in niche-product manufacturing or high technology, especially among Moncton area Francophones. As a result, some Acadian firms have developed a large number of innovative products, often with help from Université de Moncton research centres, and most of these have found an export niche.[8]

In the rural area, the economic structure is more based on the commodity sector. In Kent County for example, 23% of the labour force is employed solely in the resource sector (primary activities and processing). It would therefore seem logical to find a high proportion of companies in this sector: 31% of Acadian entrepreneurs in the Kent-Shediac region, or twice the proportion observed in Moncton. The commodity sector is dominated by two subsectors: manufacturing (12.5% of regional companies) and construction (14.7%). The latter is especially large in the region (11% of jobs compared with 7% for the Maritimes). It should be pointed out that many self-employed contractors operate in metropolitan Moncton, which has a high construction rate in the commercial, public and private areas. The manufacturing sector's business opportunities are largely associated with primary resource processing, mainly sea products (13% of Acadian entrepreneurs in the region), but also wood and peat.

The service sector accounts for 69% of Acadian businesses in the Kent-Shediac area. Dynamic services are far less valued than in Moncton and there is more emphasis on traditional services. The firms in these subsectors mainly operate on local or, at most, regional markets. Value added is low compared with dynamic services; productivity growth and the role of technological change are also less.[9]

---

[8] One example is Beltek, a new Acadian business that designed a portable printer with software for the specific needs of truckers. The firm has reached a marketing agreement with a multinational company based in New York. Other firms are breaking into foreign markets with innovative products (heat pumps, video games, electronic water meters, air exchange systems, mini-bars and so forth).

ACADIAN WOMEN AND BUSINESS: A RECENT MATCH

Greater female representation in the workplace is a strong trend of the modern economy. In Canada, the participation rate of women in the labour market grew from 40% to 58% within 20 years (1970 to 1990). They thereby increased their weight in the labour force from 33% to 45%, while also expanding the areas in which they are found. Does this mean that they are now fully integrated into the economy? The answer must be qualified, since they still head to traditional sectors, at the expense of dynamic sectors and manufacturing. The female labour force tends to congregate in lower-paid occupations such as primary resource processing, clerical work, retail sales, and accommodation and food services. Although they are well represented in the education and health professional sectors, too few of them reach the upper levels of administration and management. And this is equally true in private firms, public agencies and institutions. These trends are observed throughout the developed world. On the other hand, women have achieved a major breakthrough in the important sector of business over the last 10 years. Although their involvement was late, it was rapid and sustained. Self-employed women workers now account for more than a quarter (27%) of self-employed workers in New Brunswick (28% in Canada).[10] In Southeast New Brunswick, Francophone women are especially active in this field, as shown in Table 5, which also indicates that the proportion of women in business is slightly higher in the Kent-Shediac area (23%) than in the metropolitan Moncton area (20%).

---

[9] This is normally the case with this type of business. See Economic Council of Canada, *Good jobs bad jobs*, 1990, p. 2.

[10] Atlantic Canada Opportunities Agency, *State of Small Business and Entrepreneurship in Atlantic Canada*, 1994, p. 87.

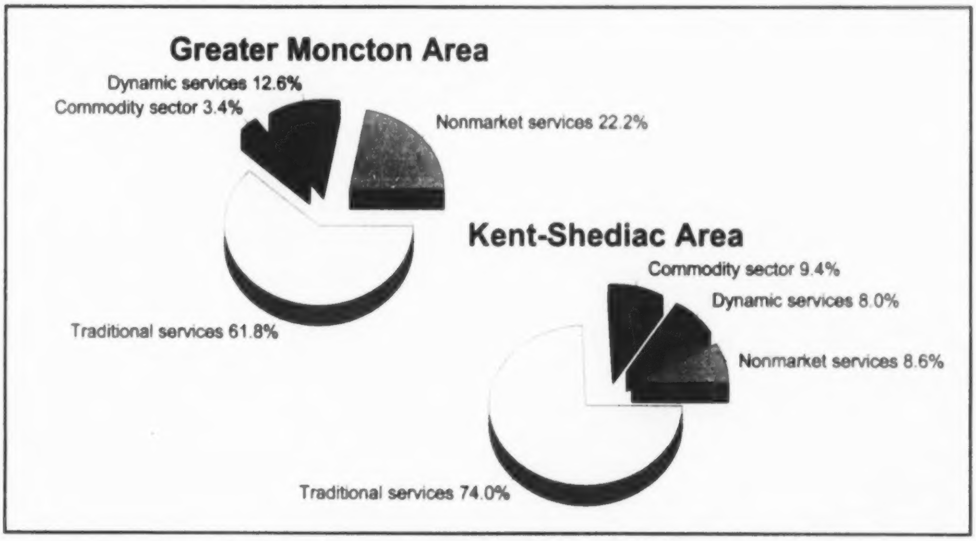
Table 5 Female Entrepreneurship in the Southeast, 1995

	Greater Moncton Area(%)		Kent/Shediac Area(%)		Atlantic Region (%)
Gender	Anglo.	Franco.	Anglo.	Franco.	Anglo. and Franco
Female	17	25	22	23	25
Male	83	75	78	77	75
Total	100	100	100	100	100

Source: KEC, SEEC, GMEC, Special Compilation by CIRRD.

This imbalance between the rural and urban sectors, although not marked, is most likely the result of the business opportunities available in the tourism industry in the Kent-Shediac area, which are very often seized by women. In the Moncton region, significant differences are noted in the area of language, with Francophone women clearly ahead of their Anglophone counterparts. Our analyses do not enable us to suggest specific reasons for imbalance, other than to recall that 84% of Francophone businesswomen operate in traditional and nonmarket services (compared with approximately 75% of Anglophone women entrepreneurs).

Figure 2 Distribution of Women Entrepreneurs by Activity Sector, 1995, (%, for Moncton and Kent-Shediac Areas)

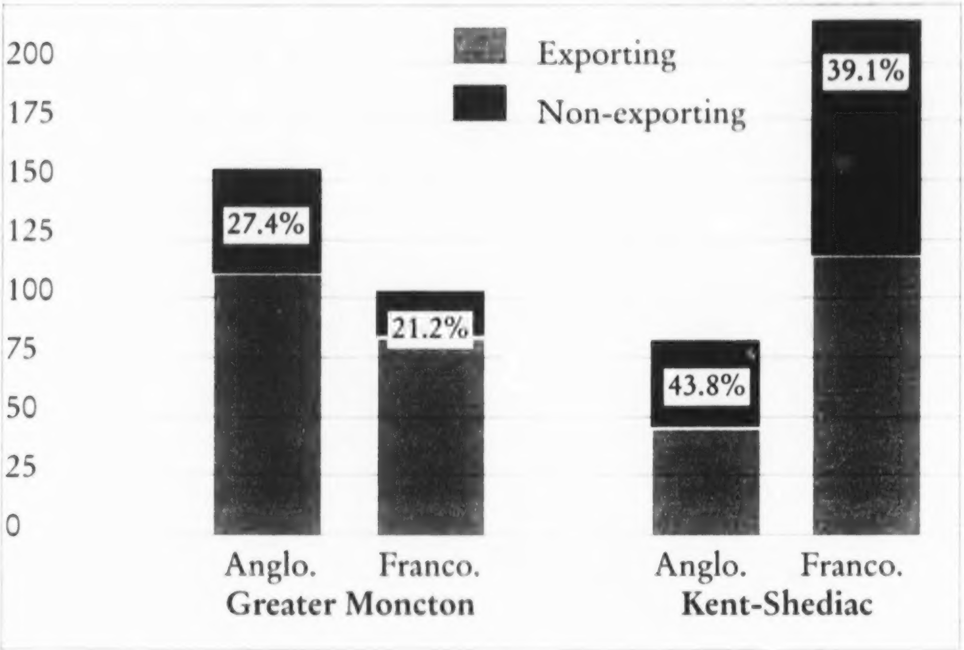


Source: Compilation by CIRRD based on data supplied by GMEC, KEC and SEC.

ACADIAN ENTREPRENEURS AND THE EXPORT SECTOR

While the percentage of the adult population in business is a good indicator of entrepreneurial vitality, its responsiveness potential is perhaps measured more by the tendency of companies to export their products and services. However, it is not yet possible to establish the import-export profile for all companies located in the Southeast. This type of data is extremely scanty and, when available, is compiled only at the large aggregation level of the provinces. However, we can get an idea of the exporting capacity of Southeast businesses by consulting the New Brunswick *Directory of Products and Manufacturers* for 1995. The numbers indicate the following.

Figure 3 Proportion of Export Oriented Manufacturing Companies, 1995



The Kent-Shediac rural area accounts for almost half (48.6%) of Southeast manufacturing firms. This is to be expected in view of the commodity sector's importance in the region. The differences emerge with respect to the export ratio (proportion of exporting companies).

It stands at 25% for manufacturing firms in the Moncton area, compared with 40% in the Kent-Shediac area. The propensity to export noted Kent-Shediac is largely due to the economic activity structure, which is substantially based on natural resources. Another interesting point is that Anglophone firms, regardless of their region, have a higher export ratio than Francophone firms. In the Greater Moncton area, the export ratio among Acadian entrepreneur is lower, since the manufacturing industry serves primarily to the regional and sometimes the national market. However, the few exporting Francophone firms are mainly found in new sectors (i.e. portable printers, instrumentation products, fast food, furniture). But one fact remains: the propensity to export is relatively low among Francophone entrepreneurs in the Moncton area and may be indicative of a lack of maturity that is justified by their late arrival on the regional entrepreneurial scene.

ACADIAN ENTREPRENEURS: CONFIRMING AN IDENTITY

Although our study is incomplete, it clearly highlights the entrepreneurial vitality of Southeast New Brunswick Acadians. However, this vitality is a recent phenomenon, since economic integration did not really happen until the 1970s. Before then, Acadians had to demonstrate exceptional ingenuity and entrepreneurship to survive. But even in the old Acadia, despite their isolation and tribulations caused by the endless disputes between France and Britain, the Acadians did survive, as a result of such factors as their trade links with the Louisbourg settlers and New England merchants. Political events finally brought an end to this centre of growth in the mid-18th Century. Later, Acadians rediscovered their business acumen in the area of lobster processing. But this revival of the entrepreneurial spirit was limited and the industry did not spread beyond a few coastal districts.[11] The drive quickly lost stream under stronger competition. It was not until the Great Depression of the 1930s that the Acadians renewed their efforts to conquer the economic sphere. It will be done through the co-operation movement, which became a major phenomenon in rural Catholic communities in the Maritimes and especially among the Acadians. The movement's contribution to the economic development of Acadian communities and naturally their region remains highly significant. Apart from this collective success, the Acadians also demonstrated their resolve as well as their organizational and business skills. Their ability to capitalize on such assets in today's climate of growing competition confirms a maturity and know-how that compares favourably with those normally associated with large established firms.[12]

---

[11] See Régis Brun, *La ruée vers le homard des Maritimes*, Michel Henry (ed.), Moncton, 1988.

But economic integration would not be confined to the limited framework of community co-operation. It was achieved through a vibrant and diversified pool of entrepreneurial talent able to capitalize on its potential, whatever its nature. We can therefore say that Acadian integration into the economy coincided with the entrepreneurial re-awakening of the 1960s and 1970s. As we indicated at the outset, it was not a matter of chance: this entrepreneurial revival was made possible by the reforms introduced in New Brunswick by the government of Louis J. Robichaud, himself an Acadian.[13] In addition, the economy of Acadian regions was stimulated by the introduction of federal programs, especially those for rural areas.[14] Establishment of a Francophone university in Moncton in 1963 and adoption of the official languages program in 1968 enfranchised Acadian society as never before. These changes restored the confidence of the younger generation, which gradually made careers in areas previously more or less reserved for Anglophones. So much so that within 10 years there were many Acadians in the provincial and federal public services and most professional sectors. In addition, they now participate more significantly in policy development, especially those directly affecting their areas of interest. By this means, they paved the way for greater integration of the business community, specifically by increasing their earnings, gaining experience in administration and management and through access to a Francophone support and development network.

---

[12] There are 171 co-operatives, including about a hundred caisses populaires, that have established a strong organizational network. The Acadian co-operative movement is very active in Prince Edward Island (18 co-operatives with 7,500 members and assets of $28 million) and Nova Scotia (29 co-operatives serving 21,000 members and generating assets of $58 million). However, it is most strongly established in New Brunswick (124 co-operatives with more than 300,000 members and total assets of $1.5 billion). The co-operatives employ more than 4,500 people, in addition to the approximately 2,000 jobs generated by the 37 co-operatives affiliated to the Conseil acadien de la coopération. Information from *Le Coopérateur Acadien* and the 1995–96 Annual Report of the Canadian Cooperation Council.

[13] In New Brunswick, the 1960s were marked by far-reaching and speedily implemented reforms introduced by the government of Louis Robichaud, the first Acadian to hold the office of Premier. He adopted pro-democratic management and attacked certain structural obstacles which clearly kept most rural areas and a number of regional centres in a condition of chronic stagnation with no hope of relief. His *Program of Equal Opportunity*, with municipal tax reform as its spearhead, had a tremendous impact at the time. The province's poorer regions and the Acadian minority who were mainly rural, benefitted greatly. See Philippe Doucet « La politique et les Acadiens », in *L'Acadie des Maritimes*, op. cit., pp. 322–328.

THE UNIVERSITY: FOCUS OF ACADIAN SOCIO-ECONOMIC EMANCIPATION

The Acadians were able to emerge from the shadows and integrate into the economy by building a substantial entrepreneurial foundation because they were able to capitalize on certain favourable conditions. There is no doubt that one such condition was the establishment of the Université de Moncton, a postsecondary institution that provided the Acadians access to higher education in their own language. The University contributed to training teachers who raised the educational level in Acadian schools. The emergence of an Acadian business class was not unrelated to this phenomenon.[15]

---

[14] The focus on rural areas during this period was part of an emancipation movement in post-industrial societies. In Canada, several programs designed to restore the socio-economic balance had already been introduced during the post-war years. Specifically for rural areas, the national ARDA (Agricultural and Rural Development Agreement) program and the federal-provincial FRED (Fund for Rural Economic Development) agreements specifically addressed the chronic problems of rural and agricultural areas. To some degree, the Robichaud government's strategy in New Brunswick was part of this historical context. For a more detailed study, see D.J. Savoie and M. Beaudin, *La lutte pour le développement : le cas du Nord-Est*, Presses de l'Université du Québec, 1988.

[15] Benjamin Higgins and Maurice Beaudin, *Impact of the Université de Moncton on the Regions of Moncton, Edmundston and Shippagan*, Canadian Institute for Research on Regional Development, Moncton, 1988.

Selection of the City of Moncton as the location for the University demonstrates the strategic vision of the founding fathers of the time. By deciding to set up the university in a mainly Anglophone urban environment, they were relying on the Acadians' ability to enter the modern age. But this was also a message to the Anglophone community, conveying the determination and desire to control their own destiny of a previously fenced-off minority. But the real benefit of this location was economic. Based as it was in a regional centre, the University benefitted from the advantages of the city environment, including a setting conducive for discussion, exchange of ideas and the gradual development of economic power. The mixed (bilingual) nature of the Moncton region was an excellent springboard for taking advantage of institutional bilingualism without being overwhelmed by it. The strictly Francophone character of the new institution shielded it from assimilation[16] while attracting the respect and recognition of the majority community. Had it been located elsewhere, for example in a purely Acadian environment, its influence would undoubtedly have been much less. The University thus quickly became a catalyst for the Maritime Francophone community and especially for the Southeast New Brunswick community. It is clear that it contributed to enfranchising the Francophone community in all fields of endeavour. It is not an exaggeration to suggest that, without the establishment of the Université de Moncton, the Acadian community would now be of interest only to historians and folklore specialists. The personal accounts are very revealing in this regard. Here are some:[17]

> The Université de Moncton and its two campuses (Shippagan and Edmundston) contributed the missing factor that enabled Acadians to truly take their place in New Brunswick. In my view, the University was one of the main factors in the emergence of the Acadians. Without a proper education system, it is difficult to develop as a people. That is why the establishment of the University made a great contribution to the development of our Acadian business people who are now the leaders of our economy.
>
> (Normand Caissie, President, Imperial Sheet Metal, Richibouctou)

---

[16] There is no doubt that without the existence of a Francophone university, which helps to keep educated Francophones in the region and attract others, and also contributes to cultural and artistic leadership, the assimilation rate of the region's Acadian minority would have been much higher.

[17] From *Entrepreneurship* magazine, Belle Productions Inc., Moncton-Richibouctou, Vol. 1, No. 1, 1995.

> We Acadians were born with the Université de Moncton. It was not so long ago that we had no lawyers, no accountants, no architects, no engineers and very few business graduates. We did not have the human resources we so badly needed to develop. This partly explains why we are only now seeing the first generation of Acadian business people.
>
> (Richard Losier, co-owner of St-Isidore Asphalte and 1992 Recipient of the New Brunswick Economic Council Entrepreneur of the Year Award)
>
> As I see it, establishment of the Université de Moncton acted and continues to act as a catalyst for the growth of Acadian entrepreneurship in a number of respects. It enabled our youth to receive a university education in French in their own province and to expand their horizons. The University opened the eyes of Acadians to economic reality and gave them confidence in their ability and potential.
>
> (Ted (E.R.) Gaudet, Vice-President, Atlantic Canada Opportunities Agency (ACOA), New Brunswick)

Université de Moncton graduates are now in senior positions in a host of economy-oriented organizations and in the public and political sectors, helping to network the entire Acadian business community. We therefore feel that it is not far-fetched to describe the University as a catalyst for the emergence of the Acadian community over the last three decades. It is clear that the institution, with more than 20 chairs and research centres including several that co-operate with the private sector, has become much more than an educational establishment. As the largest regional employer of Francophones and the contributor of more than $150 million annually to the regional economy[18], the University represents an undisputed economic asset. It also helps to attract to Moncton a constant flow of Francophones with varying links to the University campus. The University has also stimulated the establishment of a genuine network of cultural, artistic and literary leadership in Acadia. For example, there has been remarkable progress in the area of literature.[19]

---

[18] Maurice Beaudin, *Impact de l'Université de Moncton sur les centres de Moncton, Edmundston et Shippagan*, CIRRD, Moncton, 1993.

[19] The establishment in 1972 of the first publishing house in Acadia, appropriately named *Éditions d'Acadie*, was the beginning of a marked literary blossoming that led to the establishment of six other publishers. The rich crop of new works reviewed each year for the prix France-Acadie awarded to Acadian authors in the fields of literature, poetry and the humanities testifies to astonishing vitality in this field.

Since it was founded, the University has awarded more than 20,000 degrees in a wide variety of fields. Almost every member of today's Acadian elite has used or referred to the University whenever they wished, including entrepreneurs. It should be emphasized that many of its research centres establish close ties with the private sector for the introduction of new processes or products, improving the quality of existing products or promoting new technology. In 1997, the University welcomed the first three firms into its new technology park, intended to increase research and development efforts by combining the University and business resources in design and innovation. Finally, the University has already forged many international links, mainly with the Francophone countries (France and its overseas territories, Vietnam, Haiti, Francophone countries in Africa, Quebec, etc.), thus laying the ground for larger scale economic exchanges. Hosting the Francophone summit in Moncton in 1999 will undoubtedly increase recognition of Acadia within the global Francophone community.

BUSINESS DEVELOPMENT AND SUPPORT

The establishment of formal and informal networks is one indication of the Acadian community's development and has helped create significant internal links among the players as well as with the outside. How does this help strengthen Acadian entrepreneurship? Through networking which serves as a frame for the Acadians' economic, social and community expansion in both urban and rural communities; through a development structure conducive to entrepreneurship; through support to business in the areas of finance (funding sources and assistance), technology and management.

It was only in 1979 with the establishment of the New Brunswick Economic Council (NBEC) that a genuine promotion, advocacy and, above all, information tool became available to the Acadian economic community. This agency sets the tone of the partnership through its involvement with the various development authorities like chambers of commerce, industry associations, industrial development groups and external public agencies. But the involvement of Acadian entrepreneurs is not limited to membership in an organization of business people. In Southeast New Brunswick, they are active participants in the region's economic development strategy. For example, many Francophones were involved in the strategic planning exercise carried out in the early 1990s by the Greater Moncton Development Corporation. The 10 participating sectoral roundtables included four Francophone chairmen and seven Francophone co-chairmen. More than 40% of the 300 community participants were from the Acadian community. Many Greater Moncton political and economic observers agreed that this participation by Acadian entrepreneurs was partly responsible for the vitality and networking among the various regional players.[20]

In the Kent-Shediac area, while the Acadian players and entrepreneurs are obviously more widely scattered, this does not prevent their networking. Establishment of the Kent Economic Commission (KEC) and the South East Economic Commission (SEEC) in the mid-1970s marked the beginning of a networking strategy adopted by businesses in the region. In addition to these regional commissions, the network today is organized around a number of key organizations, including the Kent Local Economic Development Assistance Agency (ADEL-KENT-LEDA), the Community Futures Committee and the Eastern New Brunswick Regional Chamber of Commerce. Many businesspeople are involved in these agencies.

There is no doubt that formal and informal Acadian exchange networks have played and continue to play a role in developing, promoting and supporting Southeast Francophone entrepreneurship.[21] For example the LEDA agency in Kent County, which operates in an especially poor rural area—Kent is regarded as one of the poorest counties in Canada, has responded more than adequately to its community's specific needs. Its achievements are remarkable: from 1981 to 1995, ADEL-KENT-LEDA assisted 300 small businesses in the county, thus creating more than 2,000 jobs.[22] The agency focusses on developing the local economy and local entrepreneurs, including in the door and window, furniture, wood processing, metal fabrication and in consulting, decorating, retail trade and fish processing. According to the General Manager, Mr. Rhéal Savoie, the agency's success can be attributed to its own flexibility and to the stakeholders assuming responsibility.[23]

---

[20] René Boudreau, *Synthèse des conférences économiques et exercices de planification stratégique*, CIRRD, Moncton, 1996, p. 13.

[21] Aide au développement économique local—Kent Local Economic Development Assistance (ADEL-KENT-LEDA), *Annual Report*, 1995, 39 pages.

[22] *Atlantic Progress*, by Jill Vardy, "The French Connexion", p. 36.

---

[23] The agency's board of directors consists of local players, including experienced entrepreneurs and contacts who can assess and monitor business projects. The community aspect is always considered, though without reducing individual responsibility.

CONCLUSION

This brief analysis exposed several aspects of the answer to the questions raised in the Introduction. Since the early 1970s, we have witnessed an entrepreneurial revival in Acadia which has been especially evident in Southeast New Brunswick. This entrepreneurial vitality has manifested itself through the emergence of a relatively large number of Acadian businesspeople in an increasing variety of fields. It would also appear, for the entire study region, that the percentage of men and women in business is higher among Francophones than Anglophones, both in the Moncton and in the semi-rural Kent-Shediac areas. Although they are strongly concentrated in personal and professional services, the range is broad enough to cover the various economic fields. We wish to point out two important facts regarding the Acadian entrepreneurial pool: first, compared with Anglophones, it is more focussed on associated services and is therefore inadequately involved in the economic driving-force activities represented by dynamic services; second, a relatively small proportion of Francophone entrepreneurs export their products or services. These are key factors for expansion of the Acadian economic space, since the domestic market is severely limited. This could be explained by the recent emergence of Acadian entrepreneurship, which is also generally smaller in terms of size.

Through provincial government initiatives, Moncton has attracted a number of outside businesses in the teleservice sector, suggesting that this has been of substantial benefit to Francophone entrepreneurs. There is no doubt that Francophones in general, like the Southeast community as a whole, have benefitted, but Acadian entrepreneurship had taken off well before these companies arrived. Southeast Francophones had become integrated into the main networks through the NBEC, but also through their gradual involvement in the major planning agencies. Thus in Moncton the Francophone community established itself through economic integration, entrepreneurship and involvement in the business networks.

The vitality noted among the Southeast Francophone minority is probably explained by a combination of historical factors. The best known of these include introduction of the Program of Equal Opportunity by the Robichaud government in the early 1960s, establishment of the Université de Moncton (1963) and location of its main campus in Moncton, and the *Official Languages Act*, also introduced by the Robichaud government in 1968. Richard Hatfield's Conservative government (1970–1986) helped to consolidate these gains, especially in education (unilingual school boards) and in the constitutional area (1981 Act establishing the equality of New Brunswick's two linguistic communities, better known as Bill 88), and the subsequent entrenchment of Bill 88 in the Canadian Constitution in 1982. The Hatfield government listened to the demands of Acadian institutions and organizations for greater autonomy and greater involvement in policy development. In the meantime, the Acadian community was benefitting from the Université de Moncton, which undoubtedly acted as a catalyst for all Maritime Francophones and perhaps more for those in southeast New Brunswick, who benefitted directly from its proximity.

There is no longer any doubt that Southeast New Brunswick's Francophone minority has progressed by leaps and bounds in all respects over the last two decades. Their contribution to the region as a whole also seems clear; the region has maintained and even increased its demographic weight and strengthened its economic foundations. While Moncton has benefitted greatly from the strategy of the Frank McKenna government to attract outside business, this was partly because of the existence of a skilled bilingual labour force and also the positive climate and co-operative spirit existing between the two linguistic communities, which were major factors in the choice of location for those businesses.

There is every reason to believe that the entrepreneurial spirit of Southeast Acadians is not a temporary phenomenon. By focussing on Moncton, the Acadians have built a genuine business network and have strengthened the existing institutions. Urbanization is opening up new prospects for them by providing advantages that are often unavailable in non-urban areas. Although people are now tending to return to the regions, individuals with a strong educational background generally remain in the city. Among the main challenges facing the Acadians, there is, first and foremost, identification of the next generation of entrepreneurs. They will also require to work hard to strengthen the University and involve it more directly in economics and business. Acadians also have everything to gain from greater openness to the international Francophone community. In the age of the information highway, minorities have available to them great resources for opening up to the world, communicating, discussing and trading, but also for freeing themselves from the psychological blocks inherited from their minority situation. Being part of the Francophone world does not preclude the need for the Acadians of Southeast New Brunswick to maintain the existing climate of co-operation between the two linguistic communities, since it is in the interests of both parties and the entire region's economic prosperity.

BIBLIOGRAPHY

ADEL-KENT-LEDA. *Annual Report*, November 1995.

Affaires (Les). Special Report, March 30, 1996.

Atlantic Canada Opportunities Agency, Entrepreneurship Development Subsection. *Characteristics and Needs of Young Entrepreneurs and Young Persons Wanting to Become Entrepreneurs in Atlantic Canada*, 1995.

—, *State of Small Business and Entrepreneurship in Atlantic Canada*, 1994.

Beaudin, M. *Dynamique des marchés régionaux du travail dans l'Atlantique*. Study for Atlantic Canada Opportunities Agency, Canadian Institute for Research on Regional Development, September 1995.

Beaudin, M. *Impact de l'Université de Moncton sur les villes de Moncton, d'Edmundston et de Shippagan*. Study for the Université de Moncton in connection with the Impact campaign. Canadian Institute for Research on Regional Development, 1993.

Beaudin, M. "Rôle des entreprises, des gouvernements et des communautés dans le développement économique". Conference/Workshop presented for the seminar *L'entrepreneurship : un esprit à découvrir*, Moncton, March 1993.

Beaudin, M., G. DeBenedetti and R. Boudreau. *The Socio-Economic Vitality of Official Language Communities: Pilot Study*. Prepared for Department of Canadian Heritage. Canadian Institute for Research on Regional Development, 1995.

Boudreau, R. *Synthèse des conférences économiques et exercices de planification stratégique*. Study for the Centre assomption de recherche et de développement en entrepreneuriat. Canadian Institute for Research on Regional Development, May 1996.

Brun, R. *La ruée vers le homard des Maritimes*, Michel Henry (ed.). Moncton, 1988.

Canadian Cooperation Council. *Annual Report 1995–1996*.

Canadian Institute for Research on Regional Development. "L'État des régions : La région économique du sud-est du Nouveau-Brunswick", in Maurice Beaudin (ed.) *Collection Maritimes*, November 1995.

Coopérateur Acadien (Le), various dates.

Daigle, J. *L'Acadie des Maritimes : études thématiques des débuts à nos jours*. Chair of Acadian Studies, 1993.

Devoir (Le). Special Report on Canadian Francophonie, June 13, 1992.

Doucet, P. "La politique et les Acadiens". *L'Acadie des Maritimes : études thématiques des débuts à nos jours*. Chair of Acadian Studies, 1993.

Economic Council of Canada. *Good Jobs Bad Jobs: Employment in the Service Economy*, 1990.

Entrepreneurship Review. Moncton-Richibouctou: Belle Productions Inc., Vol. 1, No. 1, 1995.

Government of New Brunswick. *New Brunswick Products and Manufacturers Directory*–1995. Report published by the Ministry of Economic Development and Tourism, 1995.

Greater Moncton Economic Commission. *Greater Moncton Business Directory*, 1995.

Higgins, B. and M. Beaudin. *Impact of the Université de Moncton on the Regions of Moncton, Edmundston and Shippagan*. Moncton: Canadian Institute for Research on Regional Development, 1988.

Industry Canada. *Small business in Canada: A Statistical Overview*, 1994.

Juteau, D. and S. Paré. "L'entrepreneurship ethnique". *Interface*, February 1996.

Kent Economic Commission. *Kent County Business Directory*, 1993.

La Salle, Michel. *Presse (La)*. Special Article, Friday, November 15, 1991.

Lévesque, G. and D.A. Rumball. *L'entrepreneurship acadien : ses sources, son essor, son avenir*. Study for New Brunswick Economic Council. Moncton, June 1996.

Luthi, G. "Le capital-Acadie : une perspective société économique". *Revue de l'Université Sainte-Anne*, 1994.

New Brunswick Economic Council. *Annual Report*, 1995.

Parisé, T. "DOSSIER : Pouvoir économique acadien — La germination économique". *Vend'Est*, March/April 1991.

Savoie, D.J. *Regional Economic Development: Canada's Search for Solutions*. Toronto: University of Toronto Press, 1992.

Savoie, D.J. and M. Beaudin. *La lutte pour le développement : le cas du Nord-Est*. Presses de l'Université du Québec, 1988.

South East Economic Commission. *South East Business Directory*, 1995.

Thompson, P. *Small Business and Job Creation in New Brunswick–1993*. Canadian Federation of Independent Business, July 1996.

Vardy, J. "The French Connexion: New Brunswick's Acadian Business Community Has Come into its Own in Just Two Generations". *Atlantic Progress*, November/December 1995.

Walmsley, A. "City Lights (Canada's Best Cities for Business)". *Globe and Mail* (The). *Report on Business Magazine*, August 1992.

OTHER PUBLICATIONS AVAILABLE IN THE SERIES NEW CANADIAN PERSPECTIVES

OFFICIAL LANGUAGES IN CANADA: CHANGING THE LANGUAGE LANDSCAPE
ISBN 0-662-63501-9

FRANCOPHONE MINORITIES: ASSIMILATION AND COMMUNITY VITALITY
ISBN 0-662-63355-5

THE CANADIAN EXPERIENCE IN THE TEACHING OF OFFICIAL LANGUAGES
ISBN 0-662-25323-X

THE SOCIO-ECONOMIC VITALITY OF OFFICIAL LANGUAGE COMMUNITIES
ISBN 0-662-24851-1

OFFICIAL LANGUAGES AND THE ECONOMY
ISBN 0-662-24925-9

STATUS REPORT: MINORITY LANGUAGE EDUCATIONAL RIGHTS
ISBN 0-662-62409-2

FRANCOHPONES IN CANADA: A COMMUNITY OF INTERESTS
ISBN 0-662-62279-0

OFFICIAL LANGUAGES SUPPORT PROGRAMS
CANADIAN HERITAGE
OTTAWA, ONTARIO, K1A 0M5

(819) 994-2224

http://www.pch.gc.ca/offlangoff/perspectives/index.htm

BEST COPY AVAILABLE